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Message from the Author

Thank you for purchasing this rapid prototyping software product! As a hobbyist for most of my life I have been actively involved in RC. I fly RC airplanes and Helicopters. I have been building them using traditional methods throughout my life. I have always enjoyed designing, building and flying RC Models. Many, many years later, now as an adult and as an engineer the passion from RC modeling has only grown stronger. With the availability now of multiple technologies and information flow, the ability to do rapid prototyping is now possible. Most of the “cutting and sanding” work from the past is now replaced with the TJZOIDE 3D design software. I can now design an airplane and cut the parts needed, fuselage sections, wings and nacelles in as little as a few hours, rather than weeks.

The software design strategy used in designing TJZOIDE strives to balance a rich feature set with ease of use, while making it affordable to RC modelers like myself to be able to design, build and fly models in turn around times of days rather than weeks. The material of choice is extruded foam. It is lightweight, strong, available in most hardware stores and easy to cut using a hotwire.

The software design makes building an airplane model as simple as possible. Wings are made by specifying basic measurements such as wingspan, chords, sweep back or forward distances and wing location in the fuselage. Fuselages are made by drawing cross sections and specifying how far from the nose they are located. That is it. That is all it takes to design an airplane. Of course, you can get as involved as you want and as exacting as desired. Many features have been added during the course of developing the software to support the model design and build process. I use the software to build planes, and I fly the planes built with the software. As I use the software in many instances it becomes evident that some features are needed, therefore they get added.

The software is now to the point that you can benefit from it. I have made every effort to implement a full featured CAD/CAM software package specifically intended for building RC Airplanes. I enjoy using it, I hope you do too.

Fredy Irizarry

Author,

Software, Documentation and Copyright Owner, All Rights Reserved

Theory of operation

How to enter the license Key

Please refer to the License tab of the Configuration window documentation for entering your License key. Please note that this license key is uniquely created for you and the combination of the email id and license key are needed to activate the software.

How to create a fuselage

Fuselages are made of at least two cross sections. Cross sections are made up of outside shapes and inside shapes. Shapes are made up using objects such as circles, ellipses, squares, lines, rounded squares or objects imported from images. Objects project either forward towards the airplane's nose or back towards the airplane's tail or in both directions in most cases. Outside objects are identified as Cut ID 1 and are drawn in black in the screen. Inside objects are identified as Cut IDs 2,3,4 and are drawn in blue in the screen. Each cross section MUST contain both Cut IDs 1 and 2 at a minimum. All outside objects MUST connect with each other. All inside objects MUST connect with each other. To make disconnected fuselages parts use the ADD fuselage buttons and follow the guidelines in this paragraph.

How to draw objects – circles, ellipses, squares, rounded squares and lines

Click the button for the shape you want to draw (○, □, ◻, \). Press and hold down the left mouse button while moving the mouse to create the object. Once the left mouse button is released the object just created is highlighted with green squares. You can click and drag the green squares to resize, move or adjust the object's shape. The mode is automatically changed to select mode after an object is created.

How to add wings

1. To add wings to your airplane design use the Wing Maker tool. You can open the Wing Maker tool by selecting it from the Tools menu or by clicking the Wing Maker button in the tools panel of the main TJZOIDE screen.
2. In the Wing Maker screen enter the wing geometry information, root chord, wingtip chord, wingspan, sweep distance and warp amount as appropriate.
3. Click the radio button to specify whether this is a left wing, right wing, top rudder or bottom rudder.
4. Manipulate the airfoil shape to suite your model design.
5. Enter the coordinates where this wing should be added, distance from the nose of the airplane, dihedral amount and distance from the airplane centerline.
6. Click the ADD button to add this wing to your model.
7. Repeat this procedure for the remaining wings.

NOTE: Use the previous and next wing buttons to review your work. Use the UPDATE button to modify existing wings.




How to add nacelles

1. To add nacelles to your airplane design use the Nacelle Maker tool. You can open the Nacelle Maker tool by selecting it from the Tools menu or by clicking the Nacelle Maker button in the tools panel of the main TJZOIDE screen.
2. In the Nacelle Maker screen enter the nacelle geometry information, intake inner diameter, intake outer diameter, motor diameter, nacelle length, exhaust inner diameter, exhaust outer diameter as appropriate.



3. Enter the coordinates where this nacelle should be added, distance from the nose of the airplane, dihedral amounts and distance from the airplane centerline.
6. Click the ADD button to add this nacelle to your model.
7. Repeat this procedure for the remaining nacelles.

NOTE: Use the previous and next nacelle buttons to review your work. Use the UPDATE button to modify existing nacelles.



How to use center lines

1. Select the Configuration menu item from the Edit menu or press the Configuration button in the TJZOIDE main screen.
2. Configure centerline locations in the General tab of the configuration window.
3. Once configured you can press the center horizontally , center vertically  or center horizontally and vertically  buttons to align the center of the object with this line.

How to align cross sections to fuselage profile lines

1. Follow the procedure described in the Import CS section and note the requirements and limitations of the images to be imported.
2. Once the fuselage line has been imported press the align cross section to bottom fuseline  or align cross section to top fuseline  buttons.

How to make an airplane using an existing plan

1. Organize your work. Have scanned images of **each individual** cross section, 100DPI is fine for most plans.
2. Have a scanned image of the airplane profile and edit this image so that a clean bottom fuselage and top fuselage contour is available.
3. Have measurements available for each cross section distance from the nose. These should match the fuselage profile image dimensions or be adjusted appropriately.
4. Have wing geometry information for all wings. Left main wing, right main wing, rudder, right elevator, left elevator. Measure root chord, wingtip chord, wingspan from root chord to wingtip, sweep distance (setback between root leading edge and wingtip leading edge). Also note the location of the wing, distance from the nose to the root leading edge, height and dihedral amount.
5. Start at the nose cross section and follow the procedure described in the Import CS section and note the requirements and limitations of the images to be imported.
6. Enter the cross section distance from the nose by clicking in the 'Z' of the Cross Section Information Panel. A requester will open where you can enter this information. Keep all measurement in the same scale. You can resize the design later using the "Resize ALL" button.
7. Press the align cross section to bottom  or align cross section to top  fuseline buttons as appropriate to align the cross section to the airplane side view contour. In some cases this distance needs to be adjusted manually. Click and drag the imported objects as appropriate.
8. Click in the Cross Section Selection Scroll Bar Located at the left of the main TJZOIDE screen to move to a new cross section location. The Cross Section Information panel should reflect this change.
9. Continue these steps until all cross sections have been imported.
10. Add wings to your design as described in the How to add wings section using the information you collected.

NOTE: It is recommended to touch up the cross section images with an image editing software. If you have trouble importing images or need to eliminate notches and extruding parts in the drawing not part of the cross section, touch them up using an image editing software. The better the image is, the better results you will attain.

How to import a fuselage profile line

Please refer to the Import CS section in this document for information about this procedure.

How to draw an intake scoop

1. Draw or import the cross section including the scoop for Cut IDs 1 and 2 at a minimum.
2. Make sure that the Project fwd check box is not set for these objects and that the Project back checkbox is checked.
3. Now draw or import the part of the cross section that do not include the scoop which project forward.
4. Make sure that the Project back check box is not set for these objects and that the Project fwd checkbox is checked.

How to draw more complex shapes

To draw more complex shapes it is recommended you use the Import Cross Section feature. Use a drawing program such as Paint or scan images to create .bmp or .jpg images that can be imported into the software. These objects have to adhere to the requirements listed in the Import CS section of this document. They are listed here for your convenience:

Image Size – at most 3000 dots wide by 2000 dots high. Images that are bigger than this size will not be detected. Note that the bigger the image, the longer it takes to process.

Image Contrast – light color background and dark color lines like in most plans. Pictures of airplanes in scenery backgrounds will not work. Pictures with poor contrast will not be detected.

Image Location - the center of the object to be imported **must** be centered in the image. This can be verified in the Original Image View, where the Red center lines must cross inside the image to be imported.

Image Shape – Closed objects. Images with open perimeters will not be detected.

Images should be mostly round or mostly square shapes.

Shapes with concave components such as “U” or “C” shapes do not work well and might not be detected.

For your convenience a few image examples are included with TJZOIDE. Look in the “**Import CS Library**” directory for these. You can use the Import CS feature with these .JPG files to add custom shapes to your design.

You can import multiple images and use the drawing objects provided in TJZOIDE to make complex cross sections.

How to change the location of a cross section

Enter the cross section distance from the nose by clicking in the ‘**Z**’ of the Cross Section Information Panel. A requester will open where you can enter this information.

How to select a cross section to edit

Click in the Cross Section Selection Scroll Bar Located at the left of the main TJZOIDE screen to move to a new cross section location. The Cross Section Information panel should reflect this change.

How to select a fuselage to edit

Click in the Previous Fuselage Part button ($\leq\leq$) or Next Fuselage Part button ($\geq\geq$) in the Fuselage panel located in the left bottom corner of TJZOIDE main screen.

How to cut fuselage parts

1. First make sure you have added all cross sections and that all cross sections contain an outside and an inside shape as described above.
2. Open the CNC window by selecting the CNC menu item from the Tools menu in the TJZOIDE main screen or by clicking the CNC button in the tools panel of the main TJZOIDE screen.
3. Select the Fuselage tab.
4. Click the 3D (Render 3D model) button to have a visual representation of your airplane design and see the current part highlighted in red.
5. Use the previous and next fuselage as well as the previous and next fuselage section buttons to select the section you want to cut.
6. Secure a foam block in the CNC machine.
7. Align the wire as described in the CNC fuselage tab section.
8. Click the appropriate “Cut CS”, “Cut Right CS” or “Cut Left CS” button.
9. Repeat the process for other parts as appropriate.

How to Cut Wings

1. First make sure you have added all wings to your airplane design..
2. Open the CNC window by selecting the CNC menu item from the Tools menu in the TJZOIDE main screen or by clicking the CNC button in the tools panel of the main TJZOIDE screen.
3. Select the Wings tab.
4. Click the 3D (Render 3D model) button to have a visual representation of your airplane design and see the current wing highlighted in red.
5. Use the previous and next wing buttons to select the wing you want to cut.
6. Secure a foam block in the CNC machine.
7. Align the wire with the foam block as described in the Wing tab of the CNC screen section.
8. Select Cut Straight for swept back or swept forward wings if appropriate. This feature allows to cut extreme angle wings while saving foam material. When this feature is set, the wing tip and root needs to be cut afterwards manually to match your design.
9. Repeat the process for other wings as appropriate.

NOTE: It is recommended to add extra wingspan material to trim the wing to size after they are cut.

How to Add Anchor Points

It is strongly recommended that adding anchor points be the last step on your design prior to cutting fuselage parts. Anchor points are based on the final outline created by the cross sections. If you add an anchor point and then change the cross section drawing the anchor points will most likely move from the relative position where they were set and cause your parts to not be cut as intended. If you need to change your cross section design, review the anchor points associated with the design prior to cutting parts.

TJZOIDE USER MANUAL – Rapid Prototyping CNC CAD/CAM software

There are two fixed unchangeable Anchor points. These are the top center and bottom center locations of your cross sections. This is where fuselage parts are cut in “halves”. In the Anchor Points screen these are denoted by a solid vertical line that divides your cross section into the left side and right side. Again, these are fixed and cannot be changed. Previous TJZOIDE versions use these anchor points to make the wire travel proportional to top and bottom making left and right side “halves”.

1. Complete your design including all cross sections, wings and nacelles.
2. Verify that the “Use Anchor Points” check box is checked in the General tab of the Configuration screen.
3. Render a 3D representation of the model by pressing the “3D Model” button in the Main screen.
4. Select the fuselage part and cross section you want to add anchor points to.
5. Press the Anchors button in the Main screen right panel.
6. At this point the Anchor Points screen should be displayed.
7. In the Anchor Points Screen, Press the “Load CS Info” Button.
8. Press the Add Right Button to add an anchor point to the right side of the fuselage part.
9. Position the anchor point by using the Scroll Bars in the Cross Section Image panels.
10. Repeat Steps 7 though 9 until you have added all anchor points you need.
11. Press the Transfer Anchors Button <<<=====>>> to add anchors to the opposite side.
12. Use the Previous Anchor << and Next Anchor >> buttons to navigate the anchor points. The selected anchor point is highlighted in Red. Adjust Anchor Point location as desired.
13. Save your Work.

Program Requirements – Operating System

Design Machine - TJZOIDE can run the design portion of the software in a Windows XP, or Windows Vista desktop or laptop machine. Windows Vista cannot be used to drive the CNC machine.

Cutting Machine - TJZOIDE requires a Windows XP machine with an ISA or PCI parallel port to cut parts. USB to parallel adapters will not work. Use the Windows Device Manager, Ports window, Resources tab to determine the port address to use. If there are no parallel ports listed in the parallel ports section of the device manager, you will not be able to control the CNC machine.

Hardware – We recommend a 1.6GHz, 1GB Ram, 20GB hard disk desktop system or better to run the software. If using a laptop, a parallel port must be available in the laptop to drive the CNC machine. Some docking stations have a parallel port which can be used. The parallel port in a USB docking station will most likely NOT work.

Document and program nomenclature.

What is an object?

Each drawing construct that make up a cross section is an object. Circles, Squares, Lines and Imported Images are considered Objects by this program.

What is an Anchor Point?

An Anchor Point is a user specified location that alters the wire path while cutting a fuselage part. These are used to sequence the cut so that the wire moves proportionally between anchor points.

What is a Cross Section?

A Cross Section can be defined as a front view of the airplane at a specific distance from the nose. If you have built airplanes using plans, these are the views that show the shape of the fuselage at various locations. In the software the term Cross Section is abbreviated as “CS” in order to keep the screens less cluttered and provide ease of access to other features.

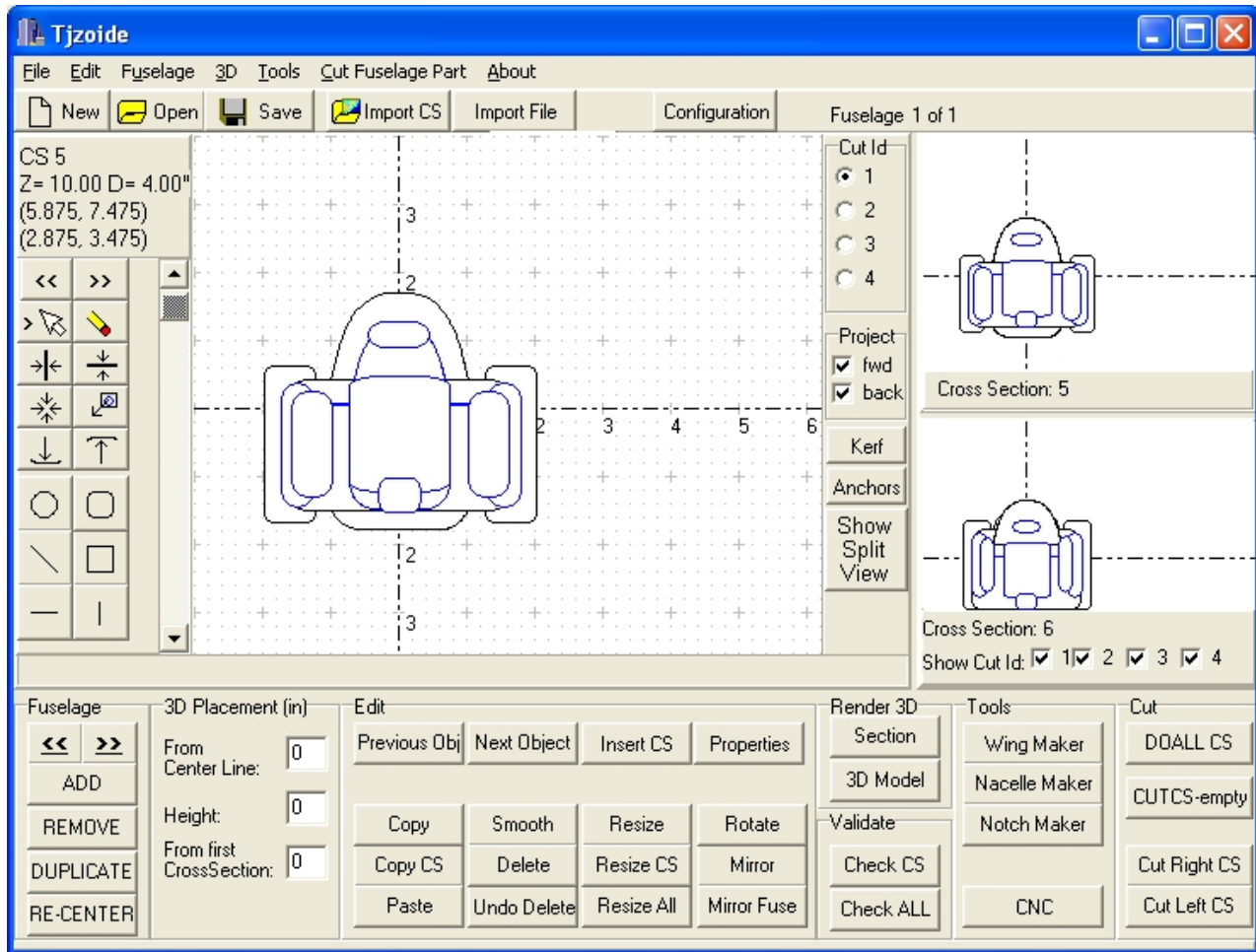
What is the Blue Tower?

The Blue tower is the part of the machine that moves one end of the wire Up and Down, Forward and Back. This would be analogous to your Right hand holding a hot cutting wire bow. When facing the front of the machine, the Blue tower is at your right hand.

What is the Green Tower?

Like the Blue tower, your left hand :-)

TJZOIDE main window



Menu Items

File Menu

New

The **New** menu item discards all cross sections, wings and nacelles in your airplane project.

Open

The **Open** menu item allows you to open an existing airplane design file.

Save

The **Save** menu item allows you to save your work into an airplane design file. File extension is “.tjz”

Import CS

The **Import CS** menu item opens the Load CS from file window. This window allows you to import Cross Sections from .jpg or .bmp files. There are certain requirements for this imports to be feasible. These are discussed later in this document.

Exit

The **Exit** menu item closes the application.

Edit Menu

Copy

The **Copy** menu item marks a selected object. This object can be pasted/duplicated using the Paste menus and buttons.

Copy CS

The **Copy CS** menu item marks all objects in the current cross section. These objects can be pasted/duplicated as a group using the Paste menus and buttons to other Cross Sections or Fuselage Parts.

Paste

The **Paste** menu item copies the object or cross section previously marked using the Copy or Copy CS menus or buttons to the current cross section. When a single object is pasted it is highlighted with red squares.

Delete

The **Delete** menu item deletes the object that is currently selected. Green or Red highlight squares identify the object to be deleted.

Undo Delete

The **Undo Delete** menu item restores the last deleted object.

Resize Object

The **Resize Object** menu item opens the resize object dialog box where the selected object can be resized by percentage.

Resize CS

The **Resize CS** menu item opens the resize cross section dialog box where the current cross section can be resized by percentage.

Resize All

The **Resize ALL** menu item opens the resize all dialog box where the entire airplane design can be resized by percentage. This is a powerful option. With this feature the entire airplane can be resized. All fuselages as well wings and nacelles are resized by percentage. All distances from for the 3D model are also resized appropriately. It should be noted that this feature allows you to scale your design to other sizes with minimum effort.

Smooth

The **Smooth** menu applies only to objects that were imported from a .jpg or .bmp file. During the import process due to the granularity of images a rough image can result. Multiple smooth commands diminish this roughness. This function cannot be undone.

Configuration

The **Configuration** menu item opens the configuration window. This window is described in the configuration section of this document.

Fuselage Menu

The **Fuselage** menu items allow you to navigate and manage various fuselage parts. Multiple fuselages can be used as an example in twin engine airplanes or in complex builds that require fuselage parts to be cut independently.

Previous

The **Previous** fuselage menu item navigates back to the previous fuselage part. The Fuselage ID and count caption in the information panel specifies which fuselage is active. Once a fuselage is active, the main TJZOIDE window is used to modify cross sections for that fuselage part.

Next

The **Next** fuselage menu item navigates forward to the next fuselage part. The Fuselage ID and count caption in the information panel specifies which fuselage is active. Once a fuselage is active, the main TJZOIDE window is used to modify cross sections for that fuselage part.

Add

The **Add** fuselage menu item creates an empty fuselage and sets this new fuselage as active. The Fuselage ID and count caption in the information panel specifies which fuselage is active. Once a fuselage is active, the main TJZOIDE window is used to modify cross sections for that fuselage part.

Remove

The **Remove** fuselage menu item deletes the active fuselage and sets the previous fuselage as active. The Fuselage ID and count caption in the information panel specifies which fuselage is active. Once a fuselage is active, the main TJZOIDE window is used to modify cross sections for that fuselage part.

Duplicate

The **Duplicate** fuselage menu item adds a new fuselage, copies the currently active fuselage into the newly created one and sets this newly added fuselage part as active. The Fuselage ID and count caption in the information panel specifies which fuselage is active. Once a fuselage is active, the main TJZOIDE window is used to modify cross sections for that fuselage part.

Re-Center

The **Re-Center** fuselage Button centers the current fuselage with the configured centerlines. This is useful after a fuselage has been resized and you want to reposition it with the centerlines.

3D Menu

Render Section

The **Render Section** button creates a 3D view of the current fuselage section by using the current and next cross section. The 3D view window is displayed. All 3D windows get updated when this button is pressed.

Render 3D Model

The **Render 3D Model** button creates a 3D view of the airplane including all wings and nacelles by using all cross sections and all fuselage parts. The 3D view window is displayed. All 3D windows get updated when this button is pressed.

Tools Menu

Wing Maker

The **Wing Maker** menu item opens the Wing Maker window. The Wing Maker window is used to add wings to your airplane design. This window is discussed later in this document.

Nacelle Maker

The **Nacelle Maker** menu item opens the Nacelle Maker window. The Nacelle Maker window is used to add nacelles for to your airplane design. These are mainly used for ducted fan systems powering your airplane. This window is discussed later in this document.

Notch Maker

The **Notch Maker** menu item opens the Notch Maker window. The Notch Maker window is used to make stand alone notches. These are not added to your design. This

tool is extremely useful to add reinforcement to your wings such as carbon fiber tubes and rods, wood dowels, wood spars and for other operations. This window is discussed later in this document.

CNC

The **CNC** menu item opens the CNC window. This window is used to control the hot wire CNC controlled machine. It allows you to cut fuselages and wings in your project, position the wire and cut notches. This window is discussed later in this document.

Cut Fuselage Part Menu

Do All CS

The DO All CS menu item prepares the current fuselage part using the current and next cross sections. Error checking is done at this point and allows you to verify the part is ready to be cut.

Cut from one piece

The **Cut from one piece** menu item opens the CNC window and cuts both sides of the current fuselage part. It also prepares the current fuselage part using the current and next cross sections if needed as if the DOALL CS button had been pressed. This feature allows to cut fuselage parts from one foam block. As an example you can cut a 3.5” wide fuselage part from a 4” foam block. When cutting from one piece you **MUST** align the cutting wire with the **center** height of the foam board.

Cut Right Side

The **Cut Right Side** menu item opens the CNC window and cuts the right side of the current fuselage part. It also prepares the current fuselage part using the current and next cross sections if needed as if the DOALL CS button had been pressed. This feature allows to cut fuselage parts with thinner foam sheets. As an example you can cut a 3.5” wide fuselage part as a 1.75” left side and a 1.75” right side from a 2” extruded foam insulation board you can buy at most hardware stores.

When cutting right sides you **MUST** align the cutting wire with the **bottom** edge of the foam board.

Cut Left Side

The **Cut Left Side** menu item opens the CNC window and cuts the left side of the current fuselage part. It also prepares the current fuselage part using the current and next cross sections if needed as if the DOALL CS button had been pressed. This feature allows to cut fuselage parts with thinner foam sheets. As an example you can cut a 3.5” wide fuselage part as a 1.75” left side and a 1.75” right side from a 2” extruded foam insulation board you can buy at most hardware stores.

When cutting left sides you **MUST** align the cutting wire with the **top** edge of the foam board.

About Menu

Version

The **Version** menu item displays the build version of your software.

Status

The **Status** menu item opens the status window which is used for debugging. Information in this window makes little sense to users.

Monitor

The **Monitor** menu item opens the monitor window. The signals in the monitor window are only updated when feedrates are set below 1000. Buttons in the Window change the output in the corresponding parallel port pin. You should stay away from the monitor window if you are not sure how the parallel port works.

Speed Buttons

New

The **New** button discards all cross sections, wings and nacelles in your airplane project.

Open

The **Open** button allows you to open an existing airplane design file.

Save

The **Save** button allows you to save your work into an airplane design file. File extension is “.tjz”

Import CS

The **Import** CS button opens the Load CS from file window. This window allows you to import Cross Sections from .jpg or .bmp files. There are certain requirements for imports to be feasible. These are discussed later in this document.

Import

The **Import** button opens the Import file requester. This window allows you to import Cross Sections from .dat, .plt (HPGL), .bm, .jpg and .tjz files. There are certain requirements for imports to be feasible.

Configuration

The **Configuration** button opens the configuration window. This window is described in the configuration section of this document.

Cross Section Information Panel

Cross Section ID

The **CS** caption specifies the active cross section. Lowered numbered cross sections are closer to the nose of the airplane.

Cross Section Z position

The **Z** position caption specifies the location of this cross section. This location must be incremented in each subsequent cross section. This location is automatically increased by the amount specified in the CSXDistance field in the General tab of the Configuration window. You can override this value by clicking in the ‘Z’. Once you click in the ‘Z’ a dialog box is opened where you can enter the desired value in inches or cm. Care must be taken so that this value is higher than the one for the previous cross section and that all subsequent cross sections are located farther away from the nose.

Mouse Coordinates

The **Mouse Coordinates** caption specify the mouse location in the screen in inches or cm.

Centerline Coordinates

The **Centerline Coordinates** caption specify the mouse location in the screen relative to the centerlines specified the Configuration window.

Object Editing Panel

Cross Section Navigation

Previous Cross Section Button

This button makes the previous non empty cross section active

Next Cross Section Button

This button makes the next non empty cross section active

Cross Section Selection Scroll Bar

The cross section selection scroll bar is used to traverse through ALL cross sections. This is of outmost importance. In order to add a new cross section you **MUST** use this scrollbar to move to an empty cross section.

Select Object Button

This button select the Select Object mode. Use this mode to select objects. This is the default mode. Use this mode to move and resize objects using the mouse. Click on an object perimeter to select it. Once successfully selected, green squares are used to highlight the object. These squares are used to resize and move the object with the mouse. Click and hold the left mouse button over a green square in the perimeter and move the mouse to resize the object. Click and hold the left mouse button over the center green square and move the mouse to move the object.

Delete Object Button

This button select the Delete Object mode. Use this mode to delete objects. Click on an object perimeter to delete it. Once successfully deleted the object is removed from your airplane design.

Center Vertically Button

When this button is clicked, the selected object, which is highlighted with green squares is centered vertically using the centerline specified in the General tab of the Configuration window.

Center Horizontally Button

When this button is clicked, the selected object, which is highlighted with green squares is centered horizontally using the centerline specified in the General tab of the Configuration window.

Center Vertically and Horizontally Button

When this button is clicked, the selected object, which is highlighted with green squares is centered both vertically and horizontally using the centerlines specified in the General tab of the Configuration window.

Center Using Cutid Button

When this button is clicked, the entire cross section is centered both vertically and horizontally using the specified cutid as a reference to the centerlines specified in the General tab of the Configuration window. Hint: Place a small circle set as cutid 4 with both forward and back projections disabled where you want the cross section centerline to be, then click this button. You can align cross sections to a centerline using this method.

Align Cross Section to Bottom Fuselage profile Button

When this button is clicked, the bottom of the entire cross section is aligned with the fuselage bottom line. The fuselage bottom and top lines are imported using the Import CS window and offset by the amount specified in the General tab of the Configuration window.

Align Cross Section to Top Fuselage profile Button

When this button is clicked, the top of the entire cross section is aligned with the fuselage top line. The fuselage bottom and top lines are imported using the Import CS window and offset by the amount specified in the General tab of the Configuration window.

Draw Elliptic and circular objects Button

This button selects the elliptical/circular shape draw mode. After clicking this button you can press and hold down the left mouse button while moving the mouse to create an elliptical object. Once the left mouse button is released the object just created is highlighted with green squares. The mode is automatically changed to select mode.

Draw Square objects Button

This button selects the rectangular/square shape draw mode. After clicking this button you can press and hold down the left mouse button while moving the mouse to create a rectangular object. Once the left mouse button is released the object just created is highlighted with green squares. The mode is automatically changed to select mode.

Draw lines object Button

This button selects the line draw mode. After clicking this button you can press and hold down the left mouse button while moving the mouse to create a line object. Once the left mouse button is released the object just created is highlighted with green squares. The mode is automatically changed to select mode.

Draw Horizontal line Button

This button selects the horizontal line draw mode. After clicking this button you can press and hold down the left mouse button while moving the mouse to create a horizontal line object. Once the left mouse button is released the object just created is highlighted with green squares. The mode is automatically changed to select mode.

Draw Vertical line Button

This button selects the vertical line draw mode. After clicking this button you can press and hold down the left mouse button while moving the mouse to create a vertical line object. Once the left mouse button is released the object just created is highlighted with green squares. The mode is automatically changed to select mode.

Bottom Panel

Fuselage Panel

The **Fuselage** buttons allow you to navigate and manage various fuselage parts. Multiple fuselages can be used as an example in twin engine airplanes or in complex builds that require fuselage parts to be cut independently.

Previous Fuselage Part Button

The **Previous** fuselage button navigates back to the previous fuselage part. The Fuselage ID and count caption in the information panel specifies which fuselage is active. Once a fuselage is active, the main TJZOIDE window is used to modify cross sections for that fuselage part.

Next Fuselage Part Button

The **Next** fuselage button navigates forward to the next fuselage part. The Fuselage ID and count caption in the information panel specifies which fuselage is active. Once a fuselage is active, the main TJZOIDE window is used to modify cross sections for that fuselage part.

Add Fuselage Part Button

The **Add** fuselage button creates an empty fuselage and sets this new fuselage as active. The Fuselage ID and count caption in the information panel specifies which fuselage is active. Once a fuselage is active, the main TJZOIDE window is used to modify cross sections for that fuselage part.

Remove Fuselage Part Button

The **Remove** fuselage button deletes the active fuselage and sets the previous fuselage as active. The Fuselage ID and count caption in the information panel specifies which fuselage is active. Once a fuselage is active, the main TJZOIDE window is used to modify cross sections for that fuselage part.

Duplicate Fuselage Part Button

The **Duplicate** fuselage button adds a new fuselage, copies the currently active fuselage into the newly created one and sets this newly added fuselage part as active. The Fuselage ID and count caption in the information panel specifies which fuselage is active. Once a fuselage is active, the main TJZOIDE window is used to modify cross sections for that fuselage part.

Re-Center Fuselage Part Button

The **Re-Center** fuselage Button centers the current fuselage with the configured centerlines. This is useful after a fuselage has been resized and you want to reposition it with the centerlines.

3D Placement Panel

From Center Line

The **From Center Line** field specifies the distance horizontally where this fuselage part is located relative to the airplane center line. This is particularly useful when creating twin engine airplanes.

Height

The **Height** field specifies the distance vertically where this fuselage part is located relative to the airplane center line. This is particularly useful when creating twin engine airplanes.

From First Cross Section

The **From First Cross Section** field specifies the distance from the front (nose) of the airplane towards the back where this fuselage part is located. This is particularly useful when creating twin engine airplanes.

Edit Panel

Previous Object Button

The **Previous Obj** button selects objects in the current cross section one after another. With complex cross sections that include many objects it is sometimes difficult to select objects using the mouse. This button makes it easier to select an object in such conditions.

Copy Button

The **Copy** button marks a selected object. This object can be pasted/duplicated using the Paste menus and buttons.

Copy Cross Section Button

The **Copy CS** button marks all objects in the current cross section. These objects can be pasted/duplicated as a group using the Paste menus and buttons to other Cross Sections or Fuselage Parts.

Paste Button

The **Paste** button copies the object or cross section previously marked using the Copy or Copy CS menus or buttons to the current cross section. When a single object is pasted it is highlighted with red squares.

Next Object Button

The **Next Object** button selects objects in the current cross section one after another. With complex cross sections that include many objects it is sometimes difficult to select objects using the mouse. This button makes it easier to select an object in such conditions.

Smooth Object Button

The **Smooth** button applies only to objects that were imported from a .jpg or .bmp file. During the import process due to the granularity of images a rough image can result. Multiple smooth commands diminish this roughness. This function cannot be undone.

Delete Object Button

The **Delete** button deletes the object that is currently selected. Green or Red highlight squares identify the object to be deleted.

Undo Delete Button

The **Undo Delete** button restores the last deleted object.

Insert Cross Section Button

The **Insert CS** button inserts an empty cross section just before the current cross section.

Resize Object Button

The **Resize Object** button opens the resize object dialog box where the selected object can be resized by percentage.

Resize Cross Section Button

The **Resize CS** button opens the resize cross section dialog box where the current cross section can be resized by percentage.

Resize All Button

The **Resize ALL** button opens the resize all dialog box where the entire airplane design can be resized by percentage. This is a powerful option. With this feature the entire airplane can be resized. All fuselages as well wings and nacelles are resized by percentage. All distances from for the 3D model are also resized appropriately. It should be noted that this feature allows you to scale your design to other sizes with minimum effort.

Properties Button

The **Properties** button opens the properties window. This window displays object data and allows for precise direct data entry for objects. The properties window is discussed later on in this document.

Rotate

The Rotate button rotates 90 degrees the selected object.

Mirror Button

The **Mirror** button modifies the selected object to be a mirror image.

Mirror Fuse Button

The **Mirror Fuse** button modifies the entire currently active fuselage. This feature is extremely useful when creating nacelles and the right nacelle (or fuselage) is a mirror image of the left one. You can create one fuselage part, DUPLICATE it and then use the Mirror Fuse button to mirror and reposition the fuselage part around the center axis.

3D Panel

Render Section

The **Section** button creates a 3D view of the current fuselage section by using the current and next cross section. The 3D view window is displayed. All 3D windows get updated when this button is pressed.

Render 3D Model

The **3D Model** button creates a 3D view of the airplane including all wings and nacelles by using all cross sections and all fuselage parts. The 3D view window is displayed. All 3D windows get updated when this button is pressed.

Validate Panel

Check Cross Section

The **Check CS** button validates the current cross section. It verifies that every object for a specific cut id are connected. All objects for a specific cut id have to be connected, if you need disconnected objects/parts, you have to create them as separate fuselage parts. You can use the Fuselage panel buttons and 3D placement panel fields to create the desired effect. If you have errors in the design, the Render 3D as well as the cut parts process will most likely have problems. This is a passive verification process where you, the user, need to manually check the design. This trade off has been established to minimize computing resources needed as this can be a CPU intensive process, as well as allow you to work at your own pace and be able to revisit cross section design. To check the entire model use the Check ALL button.

Check ALL

The **Check ALL** button validates all cross sections of all fuselages in your design. The process stops when it finds an error. It displays a message indicating which cross section and fuselage have problems. Once that problem has been corrected, press Check ALL again to look for any other problems. You should have an error free design before you attempt to cut parts.

Tools Panel

Wing Maker Button

The **Wing Maker** button opens the Wing Maker window. The Wing Maker window is used to add wings to your airplane design. This window is discussed later in this document.

Nacelle Maker Button

The **Nacelle Maker** button opens the Nacelle Maker window. The Nacelle Maker window is used to add nacelles for to your airplane design. These are mainly used for ducted fan systems powering your airplane. This window is discussed later in this document.

Notch Maker Button

The **Notch Maker** button opens the Notch Maker window. The Notch Maker window is used to make stand alone notches. These are not added to your design. This tool is extremely useful to add reinforcement to your wings such as carbon fiber tubes and rods, wood dowels, wood spars and for other operations. This window is discussed later in this document.

CNC

The **CNC** button opens the CNC window. This window is used to control the hot wire CNC controlled machine. It allows you to cut fuselages and wings in your project, position the wire and cut notches. This window is discussed later in this document.

Cut Panel

DOALL CS Button

The **DO All CS** button prepares the current fuselage part using the current and next cross sections. Error checking is done at this point and allows you to verify the part is ready to be cut.

Cut CS Button

The **Cut from one piece** button opens the CNC window and cuts both sides of the current fuselage part. It also prepares the current fuselage part using the current and next cross sections if needed as if the DOALL CS button had been pressed. This feature allows to cut fuselage parts from one foam block. As an example you can cut a 3.5” wide fuselage part from a 4” foam block. When cutting from one piece you **MUST** align the cutting wire with the **center** height of the foam board.

Cut Right CS Button

The **Cut Right Side** button opens the CNC window and cuts the right side of the current fuselage part. It also prepares the current fuselage part using the current and next cross sections if needed as if the DOALL CS button had been pressed. This feature allows to cut fuselage parts with thinner foam sheets. As an example you can cut a 3.5” wide fuselage part as a 1.75” left side and a 1.75” right side from a 2” extruded foam insulation board you can buy at most hardware stores.

When cutting right sides you **MUST** align the cutting wire with the **bottom** edge of the foam board.

Cut Left CS Button

The **Cut Left Side** button opens the CNC window and cuts the left side of the current fuselage part. It also prepares the current fuselage part using the current and next cross sections if needed as if the DOALL CS button had been pressed. This feature allows to cut fuselage parts with thinner foam sheets. As an example you can cut a 3.5” wide fuselage part as a 1.75” left side and a 1.75” right side from a 2” extruded foam insulation board you can buy at most hardware stores.

When cutting left sides you **MUST** align the cutting wire with the **top** edge of the foam board.

Left Panel

Cut Id Panel

Cut Ids are used to identify to which part of the fuselage an object belongs. The software will use the outer perimeter of all objects put together to create a cut path. These objects are grouped by cut id. The fuselage outside shape is defined by Cut ID 1. All internal cuts are identified by cut ids 2, 3 and 4. **Each cross section MUST contain cut ids 1 and 2.** Matching cut shapes from the current and next cross section are **PROPORTIONALLY** cut/traveled. Having multiple cuts allows to make these cuts proportional within each cut id. This is a somewhat complicated concept to explain in writing. We intend to publish tutorial videos to make this easier to explain.

Cut Id 1

Cut ID 1 is used to identify that this object belongs to the outside fuselage shape. **Each cross section MUST contain cut ids 1 and 2.**

Cut Id 2

Cut ID 2 is used to identify that this object belongs to an inside cut of the fuselage shape. **Each cross section MUST contain cut ids 1 and 2.**

Cut Id 3

Cut ID 3 is used to identify that this object belongs to an inside cut of the fuselage shape. This Cut id is not required.

Cut Id 4

Cut ID 4 is used to identify that this object belongs to an inside cut of the fuselage shape. This Cut id is not required.

Project Panel

The Projection panel allows you to specify if an object should only be used in a cross section only in the forward or backward direction. Lets say you have a Jet airplane model. You will want the intake scoop to project back but not forward in a specific cross section. The Split View Screens help you visualize what projects forward and what projects back.

Project Object Forward Check Box

When this Check Box is checked the object selected is used when drawing/cutting parts that project towards the front (nose) of the airplane. Creating new objects use this setting as default.

Project Object Back Check Box

When this Check Box is checked the object selected is used when drawing/cutting parts that project back towards the tail of the airplane. Creating new objects use this setting as default.

Kerf Button

The **Kerf** button opens the kerf data window for this cross section. In this window you can specify the appropriate compensation values for each cut id and for each projection. For CutID 1 positive values increase the size of the wire path, while

negative values make the cut path smaller. For CutID 2,3, and 4 positive values decrease the size of the wire path, while negative values make the wire cut path bigger. Although CutID 1 differs in behavior from 2,3 and 4, since CutID 2,3, and 4 are intended to be internal cuts, reducing the size for positive numbers make it easier to enter data.

Anchors Button

The **Anchors** button opens the Anchor Points window. This button is only visible if the “Use Anchor Points” check box in the configuration window has been checked. Refer to the Anchor Points Window Section for more details.

Show Split View Button

The **Show Split View** button shows the split view screens which help you visualize what project forward and what projects back.

Split View Panel

The Split View Panel shows the objects in the current and next cross section that will be used to create a fuselage part section.

Current Cross Section Project Back View

This view shows all objects in the current cross section that project back towards the tail of the airplane.

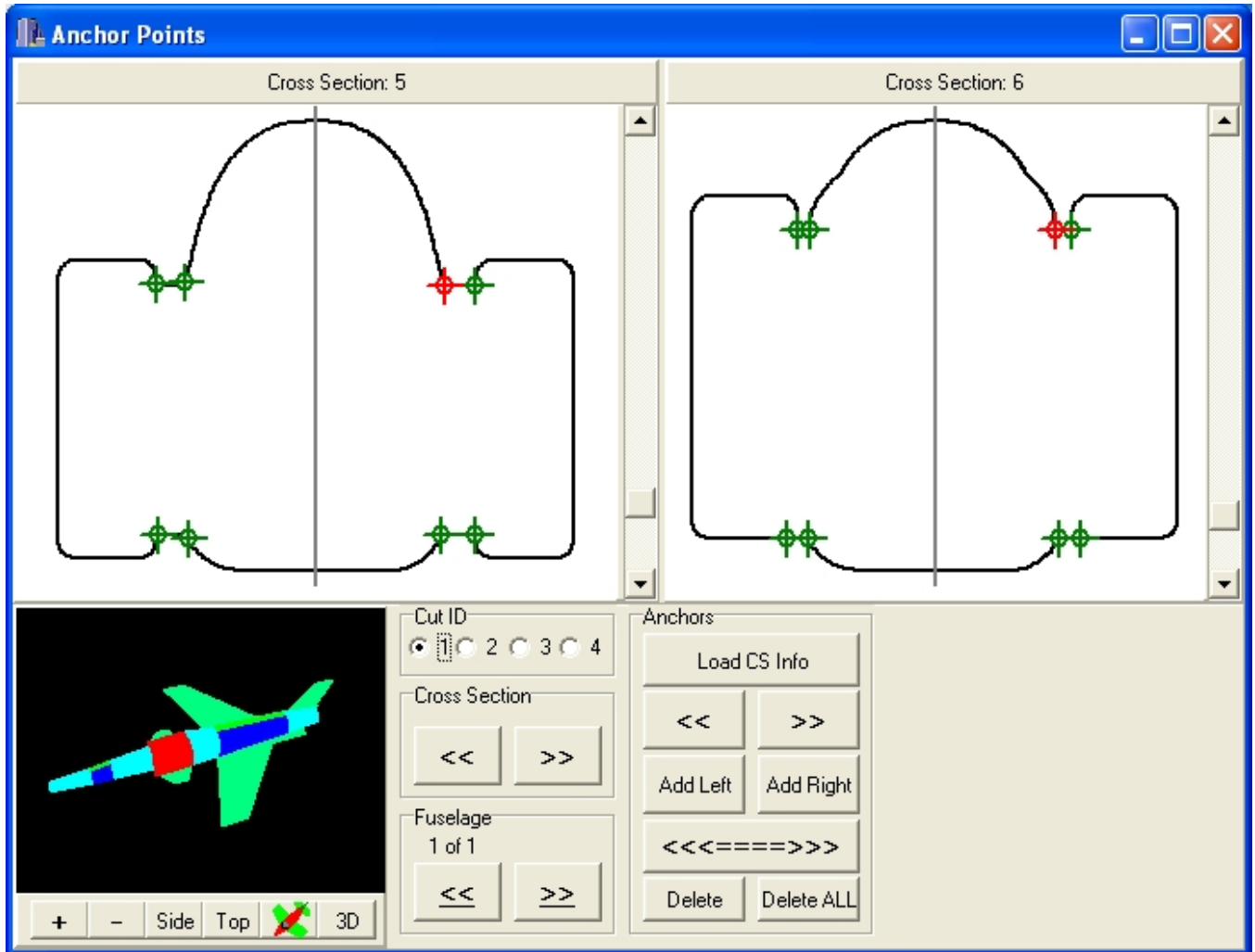
Next Cross Section Project Forward View

This view shows all objects in the next cross section that project forward towards the front (nose) of the airplane.

Show Cut ID selection Check Box

Use these Check Boxes to select which Cut Ids you want to view. This is only a viewing option and does not change the object setting or cutting shape. These are useful to determine if there are missing cut or projections between cross sections.

Anchor Points Window



3D View Panel

3D Image

The 3D image window shows a 3D representation of your model. The fuselage section being selected is highlighted in the 3D image by drawing it Red. In order to view this representation you have to first press the 3D render button. This step is left to be done manually because rendering 3D images is a CPU intensive process that can negatively affect program performance.

+ Zoom Button

Enlarges the 3D image view, zooms in.

- Zoom Button

Reduces the 3D image view, zooms out.

Side View Button

Rotates the airplane view so that a side view of the model is displayed.

Top View Button

Rotates the airplane view so that a top view of the model is displayed.

Aspect View Button

Rotates the airplane view so that an aspect view of the model is displayed.

3D Render Button

The **Render 3D Model** button creates a 3D view of the airplane including all wings and nacelles by using all cross sections and all fuselage parts. All 3D windows get updated when this button is pressed.

Cut ID Panel

Radio Button 1

The Radio Button 1 selects the outside perimeter of the fuselage part. Anchor points for this specific cut id are displayed and can be edited.

Radio Button 2

The Radio Button 2 selects the inside perimeter of the fuselage part. Anchor points for this specific cut id are displayed and can be edited. If there are no objects that project into this section with this cut id, nothing is displayed in the edit windows.

Radio Button 3

The Radio Button 3 selects the inside perimeter of the fuselage part. Anchor points for this specific cut id are displayed and can be edited. If there are no objects that project into this section with this cut id, nothing is displayed in the edit windows.

Radio Button 4

The Radio Button 4 selects the inside perimeter of the fuselage part. Anchor points for this specific cut id are displayed and can be edited. If there are no objects that project into this section with this cut id, nothing is displayed in the edit windows.

Cross Section Panel

Previous Cross Section Button <<

The Previous Cross Section Button selects the previous Cross Section for the active fuselage part. After selecting a Cross Section press the “Load CS Info” button to process and load Anchor Point information.

Next Cross Section Button >>

The Next Cross Section Button selects the next Cross Section for the active fuselage part. After selecting a Cross Section press the “Load CS Info” button to process and load Anchor Point information.

Fuselage Panel

Previous Fuselage Button <<

The Previous Fuselage Button selects the previous fuselage part. After selecting a fuselage and Cross Section press the “Load CS Info” button to process and load Anchor Point information.

Next Fuselage Button >>

The Next Fuselage Button selects the next fuselage part. After selecting a fuselage and Cross Section press the “Load CS Info” button to process and load Anchor Point information.

Anchors Panel

Load CS Info Button

The Load CS Info Button processes the selected fuselage part using the frontward and backward cross sections and load the shape outline onto the Cross Section Images. After this step is completed you can add/delete and modify anchor points.

Previous Anchor Button <<

The Previous Anchor Button selects the next (clockwise) anchor for the selected Cross Section and CutID. Anchor location can be moved by using the scroll bars in the Cross

Section windows. Moving the scroll bar Up moves the anchor point counter-clockwise and moving the scroll bar Down moves the anchor point clockwise.

Next Anchor Button >>

The Next Anchor Button selects the previous (counter-clockwise) anchor for the selected Cross Section and CutID. Anchor location can be moved by using the scroll bars in the Cross Section windows. Moving the scroll bar Up moves the anchor point counter-clockwise and moving the scroll bar Down moves the anchor point clockwise.

Add Left Button

The Add Left Button adds an anchor point to the left side of the Cross Sections. Use the associated scroll bars to position the exact location where the anchor point should be located.

Add Right Button

The Add Right Button adds an anchor point to the right side of the Cross Sections. Use the associated scroll bars to position the exact location where the anchor point should be located.

Transfer Anchors Button <<<=====>>>

The Transfer Anchors Button adds an anchor points from the left side to the corresponding location at the right side of the Cross Sections and vice-versa. The locations are approximate. Use the Next and Previous Anchor buttons along with the scroll bars to position the anchor points exactly where you want them

Delete Anchor Button

The Delete Anchor Button removes the highlighted anchor point.

Delete ALL Button

The Delete ALL Button removes all the anchor points for this CutID and these Cross Sections.

Properties Window

Property	Value
Shape	CIRCLE
PosX	1.5486175
PosY	1.997495
Width	2.289265
Height	2.0199375
RadiusX	0
RadiusY	0
GroupID	1
Multiplier	1
Project FWD	1
Project Back	1
CrossSection	4
Cut ID	1

Below the table, there are control buttons and a numeric input field:

- Buttons: Resize, Smooth, Apply, Delete, <<, >>
- Icons: Four directional arrows (left, right, up, down) and a center icon.
- Input field: A numeric field containing the value '100'.

Object Properties Column and Value Field

Shape

The shape value field indicates the type of object currently selected. This is an informational field – do not change this value.

PosX

The PosX field is the Horizontal location in the TJZOIDE program for the selected object. You can change the value of this field to enter a specific location. After changing this value press the Apply button to update the selected object.

PosY

The PosY field is the Vertical location in the TJZOIDE program for the selected object. You can change the value of this field to enter a specific location. After changing this value press the Apply button to update the selected object.

Width

The Width field is the width of the selected object. You can change the value of this field to enter a specific width. After changing this value press the Apply button to update the selected object.

Height

The Height field is the width of the selected object. You can change the value of this field to enter a specific height. After changing this value press the Apply button to update the selected object.

Radius X

The Radius X field is the radius value of the selected for rounded rectangle object. You can change the value of this field to enter a specific radius. After changing this value press the Apply button to update the selected object.

Radius Y

The Radius Y field is the radius value of the selected for rounded rectangle object. You can change the value of this field to enter a specific radius. After changing this value press the Apply button to update the selected object.

GroupID

The GroupID value field contains information used internally for the object currently selected. This is an informational field – do not change this value.

Multiplier

The Multiplier value field contains information used internally for the object currently selected. This is an informational field – do not change this value.

Project Forward

The Project Forward value field indicates that the selected object projects forward towards the nose of the airplane design when set to 1. When set to 0 the selected object does not project forward. After changing this value press the Apply button to update the selected object.

Project Back

The Project Back value field indicates that the selected object projects back towards the tail of the airplane design when set to 1. When set to 0 the selected object does not project back. After changing this value press the Apply button to update the selected object.

Cross Section

The Cross Section value field indicates to which cross section the selected object belongs to. The valid value range for this field is between 1 and 400. You can change the value of this field to enter a specific cross section. After changing this value press the Apply button to update the selected object. Note that the object will be moved to the specified cross section and might not be viewable in the currently active cross section.

Cut ID

The Cut ID value field indicates whether the selected object is part of the fuselage outside shape when set to 1 or part of an internal cut (cut ids 2,3,4). You can change the value of this field to enter a specific cut id. After changing this value press the Apply button to update the selected object.

Actions Panel

Resize Button

When the Resize button is pressed the selected object is resized to the percentage specified in the Resize Percentage field.

Resize Percentage Field

Enter the percentage to resize the selected object in this field

Smooth Button

When the Smooth button is pressed the selected object is smoothed, making objects more rounded. The Smooth button has effect on OBJECT Shapes.

Apply Button

When the Apply button is pressed the selected object is updated with any information entered in the various value fields.

Delete Button

When the Delete button is pressed the currently selected object is removed from the airplane design.

Center Vertically Button

When this button is clicked, the selected object, which is highlighted with green squares, is centered vertically using the centerline specified in the General tab of the Configuration window.

Center Horizontally Button

When this button is clicked, the selected object, which is highlighted with green squares, is centered horizontally using the centerline specified in the General tab of the Configuration window.

Center Vertically and Horizontally Button

When this button is clicked, the selected object, which is highlighted with green squares, is centered both vertically and horizontally using the centerlines specified in the General tab of the Configuration window.

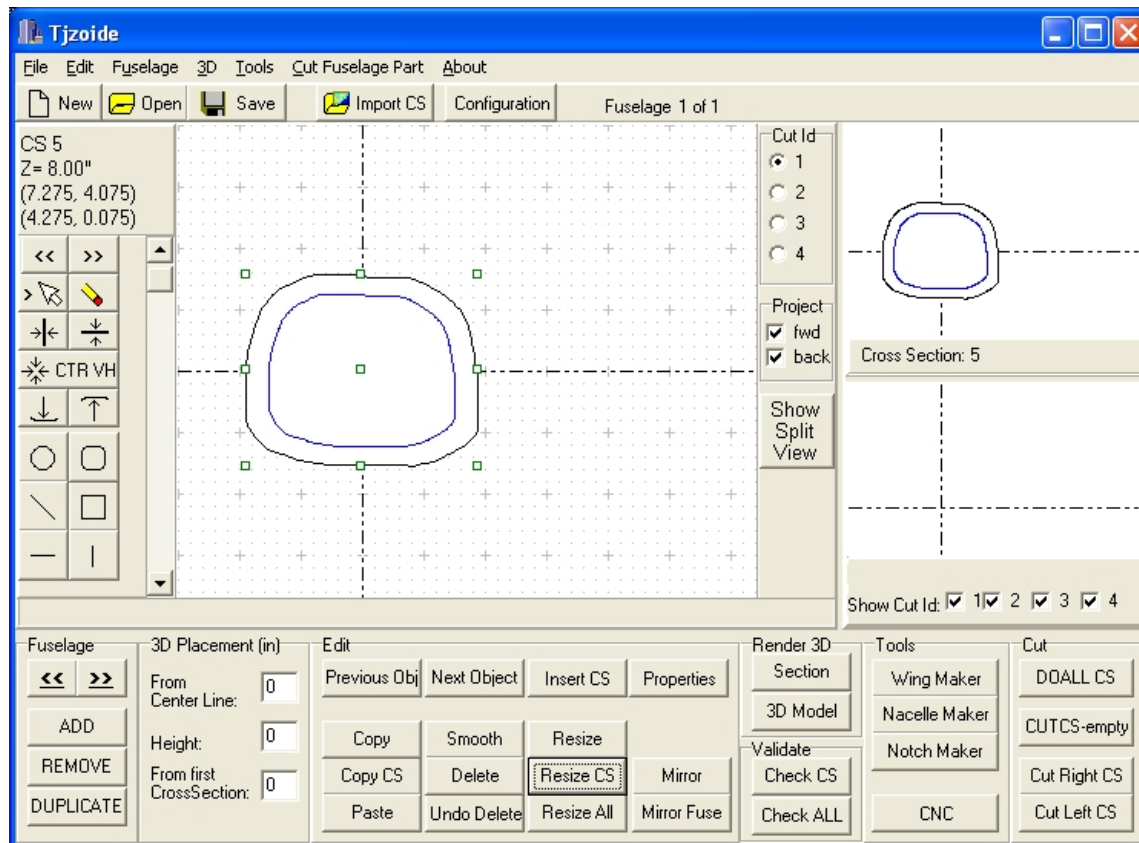
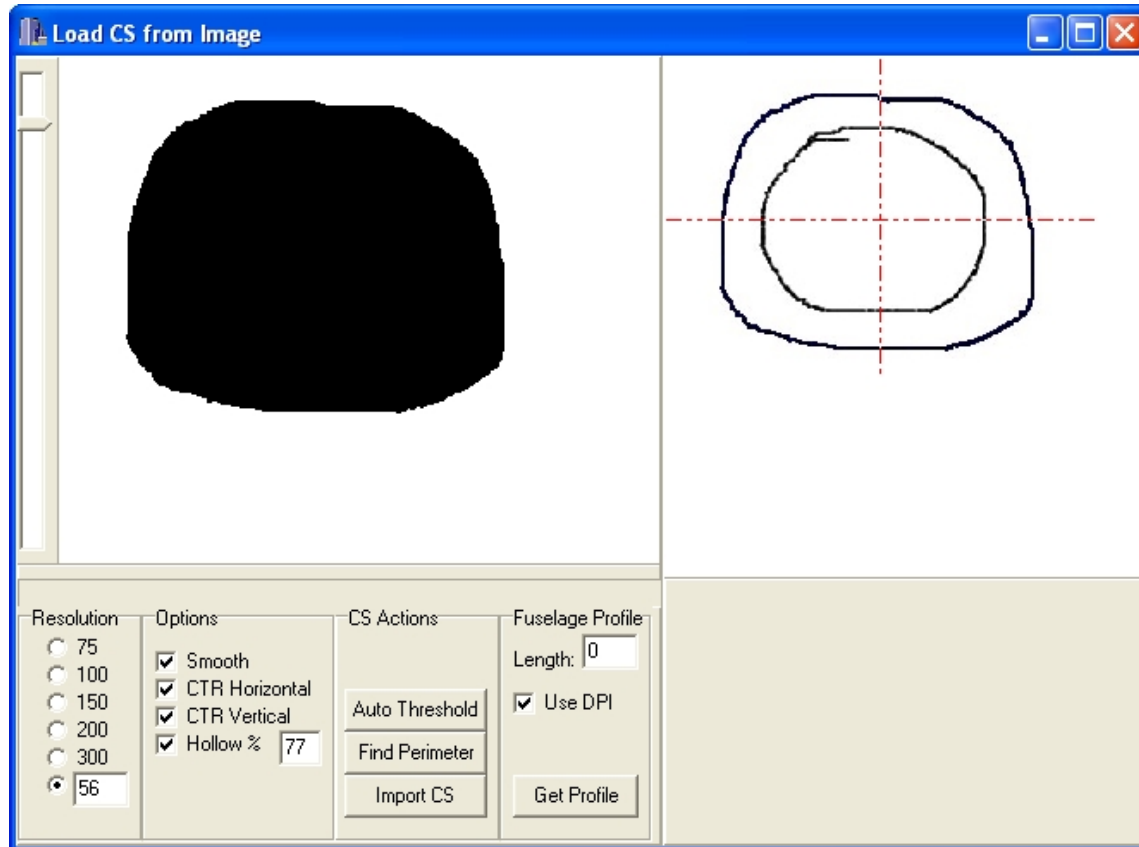
Align Cross Section to Bottom Fuselage profile Button

When this button is clicked, the bottom of the entire cross section is aligned with the fuselage bottom line. The fuselage bottom and top lines are imported using the Import CS window and offset by the amount specified in the General tab of the Configuration window.

Align Cross Section to Top Fuselage profile Button

When this button is clicked, the top of the entire cross section is aligned with the fuselage top line. The fuselage bottom and top lines are imported using the Import CS window and offset by the amount specified in the General tab of the Configuration window.

TJZOIDE USER MANUAL – Rapid Prototyping CNC CAD/CAM software
Import Cross Section Window



Processed Cross Section View Image

The Processed Cross Section View Image shows the shape of the cross section image that is detected. When blank, TJZOIDE has not been able to import the image.

Original Image View

The Original Image View displays a scaled version of the image you are trying to import. The intersection of the Red centerlines in this view **MUST** be **INSIDE** of the cross section image you are trying to import. The image must be centered in the .jpg or .bmp view and must be of good contrast where the background is of light color and the shape to be imported is of dark color – as in most plans. Pictures of airplanes will not work.

Contrast Threshold Slider

This slider specifies the setting for the threshold used in detection the appropriate contrast filter for detecting images, It can be manually adjusted, but in general the Auto Threshold button should be used. In some instances it is necessary to restart the Auto Threshold feature. In such cases, move the slider all the way up before pressing the Auto Threshold button. If this slider moved to the bottom of the range and no image is detected, refer to the image limitations and requirements sections to determine the cause of the problem. You can use drawing programs to resolve those issues before trying to import again.

Resolution Panel

Use the Resolution panel to specify how many dots per inch the image being imported is. This setting is used to determine the resulting object size for imported cross sections as well as fuselage top and bottom profile line length.

75 DPI Radio Button

100 DPI Radio Button

150 DPI Radio Button

200 DPI Radio Button

300 DPI Radio Button

Other DPI Radio Button

Other DPI Field

Options Panel

Smooth Check Box

Check this check box when you want to smooth a cross section object imported from a .jpg or .bmp file automatically. Objects can be rough due to the scan and import process. Smoothing make the objects more rounded.

Center Horizontal Check Box

Check this check box when you want to automatically center the object horizontally along the configured horizontal center line after it has been imported.

Center Vertical Check Box

Check this check box when you want to automatically center the object vertically along the configured vertical center line after it has been imported.

Create Hollow Object Check Box

Check this check box if you want the object to be imported both as Cut ID 1 and Cut ID 2. Cut ID 2 objects are imported as a percentage of the original size.

Create Hollow Object Percentage Field

Enter the percentage to be used when importing Cut ID 2 internal cut objects.

Cross Section Actions Panel

Auto Threshold Button

Press the Auto Threshold button to fine tune the contrast best suited to the particular image being imported. In some situations it is impossible to detect an appropriate setting and import is not possible. Keep also in mind the limitations and requirements for importing images. The intersection of the Red centerlines in the Original Image View MUST be INSIDE of the cross section image you are trying to import. The image MUST be centered in the .jpg or .bmp view and MUST be of good contrast where the background is of light color and the shape to be imported is of dark color – as in most plans. Pictures of airplanes will not work.

Find Perimeter Button

Once the image is successfully detected, pressing the Find Perimeter button will preview the shape that will be imported.

Import Cross Section Button

Press this button to import the currently detected object into the current cross section of TJZOIDES fuselage main design window.

Fuselage Profile Panel

Fuselage Images are a side view of the airplane you are designing. The top and bottom profile of the airplane are used to align any cross sections to this contour. The Show Fuselines check box and field in the General tab of the configuration window along with the cross section distance from the nose determine where these are placed. The same limitations and requirements of the cross section images apply. The intersection of the Red centerlines in the Original Image View MUST be INSIDE of the cross section image you are trying to import. The image must be centered in the .jpg or .bmp view and must be of good contrast where the background is of light color and the shape to be imported is of dark color – as in most plans. Pictures of airplanes will not work.

Fuselage Image Length Field

Use this field to specify the length of the fuselage line being imported. It is better to use the Use DPI check box so that the program determines the actual fuselage line length. In some instances where images are at different scales is necessary to use this field.

Use DPI Check Box

When the Use DPI check box is checked TJZOIDE uses the DPI setting to determine the actual fuselage line length and the Fuselage Image Length field is ignored. It is highly recommended to use this setting whenever possible instead of the Fuselage Image Length Field.

Get Profile Button

When the Get Profile Button is pressed the detected image top and bottom fuseline profile (contour) is loaded into memory so you can align cross sections to this line

Import Image Limitations

Image Size – at most 3000 dots wide by 2000 dots high. Images that are bigger than this size will not be detected. Note that the bigger the image, the longer it takes to process.

Image Contrast – light color background and dark color lines like in most plans. Pictures of airplanes in scenery backgrounds will not work. Pictures with poor contrast will not be detected.

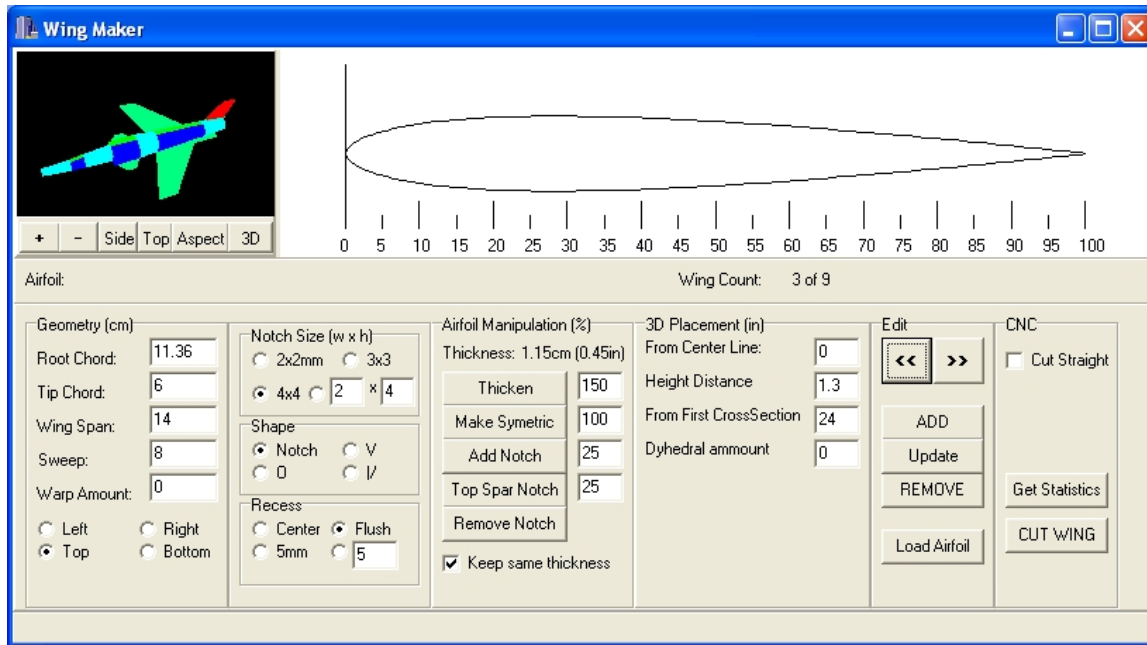
Image Location - the center of the object to be imported must be centered in the image. This can be verified in the Original Image View, where the Red center lines must cross inside the image to be imported.

Image Shape – Closed objects. Images with open perimeters will not be detected.

Images should be mostly round or mostly square shapes.

Shapes with concave components such as “U” or “C” shapes do not work well and might not be detected.

Wing Maker Window



3D View Panel

3D Image

The 3D image window shows a 3D representation of your model. The wing being selected is highlighted in the 3D image by drawing it Red. In order to view this representation you have to first press the 3D render button. This step is left to be done manually because rendering 3D images is a CPU intensive process that can negatively affect program performance.

+ Zoom Button

Enlarges the 3D image view, zooms in.

- Zoom Button

Reduces the 3D image view, zooms out.

Side View Button

Rotates the airplane view so that a side view of the model is displayed.

Top View Button

Rotates the airplane view so that a top view of the model is displayed.

Aspect View Button

Rotates the airplane view so that an aspect view of the model is displayed.

3D Render Button

The **Render 3D Model** button creates a 3D view of the airplane including all wings and nacelles by using all cross sections and all fuselage parts. All 3D windows get updated when this button is pressed.

Airfoil Profile Image

The Airfoil profile image gives a graphical view of the current wing airfoil being used. When the airfoil is manipulated through the Wing Maker updated views are drawn in this panel.

Airfoil Percent Markers

The airfoils percentage marker are useful to determine where to locate notches in the wing.

Information Panel

Airfoil File Caption

Indicates which airfoil file is being used to create the airfoil. Many of the NACA airfoil files are supported. Use the Load Airfoil button to load a different airfoil profile.

Wing id and Count Caption

The Wing ID caption displays the wing ID (number) and wing count for the selected wing in the airplane.

Geometry Panel

The geometry panel displays wing dimensions information for the selected wing. These are informational fields and cannot be edited. To change wing dimension use the Wing Maker tool and update the wing once changes are made.

Root Chord Field

The Root Chord field is used to enter the dimension of the airfoil at the root of the selected wing.

Tip Chord Field

The Tip Chord field is used to enter the dimension of the airfoil at the wing tip of the selected wing.

Wing Span Field

The Wing Span field is used to enter the wingspan of the of the selected wing.

Sweep Field

The Sweep field is used to enter the setback distance between the leading edge of the root chord and the leading edge of the tip chord of the wing for the selected wing.

Warp Field

The Warp field is used to enter the distance between the wingtip leading edge from a level position for the selected wing. For most wings set it to 0.

Left Wing Radio Button

Select the Left Wing radio button if this wing goes in the left side of the fuselage.

Right Wing Radio Button

Select the Right Wing radio button if this wing goes in the right side of the fuselage.

Rudder Wing Radio Button

Select the Rudder Wing radio button if this is a rudder wing that goes in the top side of the fuselage. This is normally the case for most rudders.

Bottom Rudder Wing Radio Button

Select the Bottom Rudder Wing radio button if this is a rudder wing that goes in the bottom side of the fuselage.

Notch Size Panel

Please note that due to way to many factors these settings might not produce the exact amount you desire. Wire, temperature, federate speed, material amount, wing shape and thickness among other things make this a very challenging cut. You should practice, fine tune and get to know your machine when using this feature. In many instances the stand alone Notch Maker tool produces better results after the wing is cut.

2x2mm Radio Button

This radio button specifies a notch 2mm wide by 2mm high.

3x3mm Radio Button

This radio button specifies a notch 2mm wide by 2mm high.

4x4mm Radio Button

This radio button specifies a notch 2mm wide by 2mm high.

Other Radio Button

This radio button specifies a custom notch size.

Other Width Field

Enter the width in millimeters of the custom size notch you desire.

Other Height Field

Enter the Height in millimeters of the custom size notch you desire.

Notch Shape Panel

Notch Radio Button

Select this radio button to select a rectangular notch. Use this if you want to use flat carbon fiber strips, plywood or hardwood for reinforcement.

O Radio Button

Select this radio button to select a circular notch. This is useful when you want to reinforce the wing with carbon fiber tubes, carbon fiber rods or wooden dowels.

V Radio Button

Select this radio button to select a V shaped notch. You can use this for aileron or elevator cuts in preparation to hinge the surface. These are typically done as “flush” and from the bottom of the airfoil at approximately 75~85% of the airfoil location.

/ Radio Button

Select this radio button to select a / shaped notch. One side of the cut is done straight down, while the other is done at an angle as specified by the size of the notch. You can use this for aileron or elevator cuts in preparation to hinge the surface. These are typically done as “flush” and from the bottom of the airfoil at approximately 75~85% of the airfoil location.

Notch Recess Panel

Center Radio Button

Select the Center radio button if you want the software to place the notch in the center of the root airfoil. When used in combination with the **Keep same thickness** checkbox the notch is centered in the thickness of the wing. If the **Keep same thickness** checkbox is not set, the notch will not be centered.

Flush Radio Button

Select the Flush radio button if you want the notch to be flush with the airfoil surface. This is useful when adding flat strips or rectangular/square strips to reinforce the wing.

5mm Radio Button

Select the 5mm radio button if you want the notch to be recessed 5mm from the surface of the airfoil.

Other Radio Button

Select the Other radio button if you want to specify the recess amount in the Other Recess field. The notch will be recessed by this amount in millimeters from the surface of the airfoil.

Other Recess Field

Enter a specific recess amount.

Airfoil Manipulation Panel

Airfoil Thickness Caption

The Airfoil Thickness caption display the maximum wing thickness for the selected wing.

Thicken Button

The **Thicken** button uses the percentage entered in the Thicken field to change the Curve in the Top of the airfoil. The bottom of the airfoil is left unchanged.

Thicken Field

Enter the percentage in the Thicken field by which you want to modify the top curve of the airfoil.

Make Symmetric Button

The **Make Symmetric** button uses the percentage in the make symmetric field to modify the bottom curve of the airfoil. 0% make a flat airfoil, 100% a fully symmetric airfoil.

Make Symmetric Field

Enter the percentage in the Make Symmetric field by which you want to make the bottom airfoil symmetric to the top airfoil. 0% gives you a flat bottom, 100% a fully symmetric airfoil.

Add Notch Button

The **Add Notch** button uses the selections made in the notch panel to add a notch at the location and shape specified by the Notch panel options and percentage of chord specified. The notch is accessed from the bottom side of the wing. Please note that for small thickness wings it is best to make the notches after the wing has been cut using the Notch Maker tool.

Add Notch Field

Enter a percentage in the Add Notch field of the chord to specify where you want the notch added.

Top Spar Notch Button

The **Top Spar Notch** button uses the selections made in the notch panel to add a notch at the location and shape specified by the Notch panel options and percentage of chord specified. The notch is accessed from the top side of the wing. Please note that for small thickness wings it is best to make the notches after the wing has been cut using the Notch Maker tool.

Top Spar Notch Field

Enter a percentage in the Add Notch field of the chord to specify where you want the notch added.

Remove Notch Button

The **Remove Notch** button removes all notches from the current wing.

Keep same Thickness Check Box

When the **Keep same thickness** checkbox is checked, the airfoil at the wingtip is deformed so that the same maximum thickness at the root airfoil is kept throughout the wing. This is particularly useful when cutting small tapered wings, or highly tapered wings,

3D Placement Panel

From Center Line Field

The **From Center Line** field specifies the distance horizontally where this wing is located relative to the airplane center line.

Height Distance Field

The **Height** field specifies the distance vertically where this wing is located relative to the airplane center line.

From First Cross Section Field

The **From First Cross Section** field specifies the distance from the front (nose) of the airplane towards the back where this wing is located.

Dihedral amount Field

The **Dihedral** amount field specifies the wingtip vertical offset of the airfoil at the wingtip relative to the root airfoil.

Edit Panel

Previous Wing Button

The **Previous** Wing button selects the previous wing in your airplane design. The 3D image screen is updated to highlight the window and the wing ID and count caption is updated.

Next Wing Button

The **Next** Wing button selects the next wing in your airplane design. The 3D image screen is updated to highlight the window and the wing ID and count caption is updated.

Add Wing Button

After you have entered all the wing information such as root chord, tip chord, wingspan, sweep distance, warp amount and 3D location as well as adjusted the airfoil to your specifications in the various Wing Maker window fields, press the ADD button so that the wing is added to your design. Tip: for most airplanes you can enter the data for one wing – say the left wing, then press the ADD button, then select the Right wing Radio button and click ADD again. This creates two identical wing, one being for the left side and another being the right side wing.

Update Wing Button

If after you have added a wing you decide to make changes, update all the pertinent fields in the Wing Maker window and press the UPDATE button. Press this button rather than the ADD button when making changes. If you press the add button a new wing will get created.

Remove Wing Button

The REMOVE wing button removes the current wing from your airplane design. This cannot be undone.

Load Airfoil Button

Press this button to load an airfoil file. Many NACA airfoil files are supported, but not all. If the Airfoil Profile Image does not show an airfoil shape, the file is not supported. Try a different one.

CNC Panel

Cut Wing Straight Check Box

Use the Cut Wing Straight check box to cut sweep wings. The wing is laid out in such a way that a minimum amount of material is used by extending the wingspan while shortening the root and wingtip chord. After the wing is cut, you will have to manually make an angled cut to match your wing design. It is highly recommended to use this feature to keep the travel distances of your machine to a minimum. Some wings would otherwise require extreme travels that would make it impossible to cut in most hobbyist CNC machines.

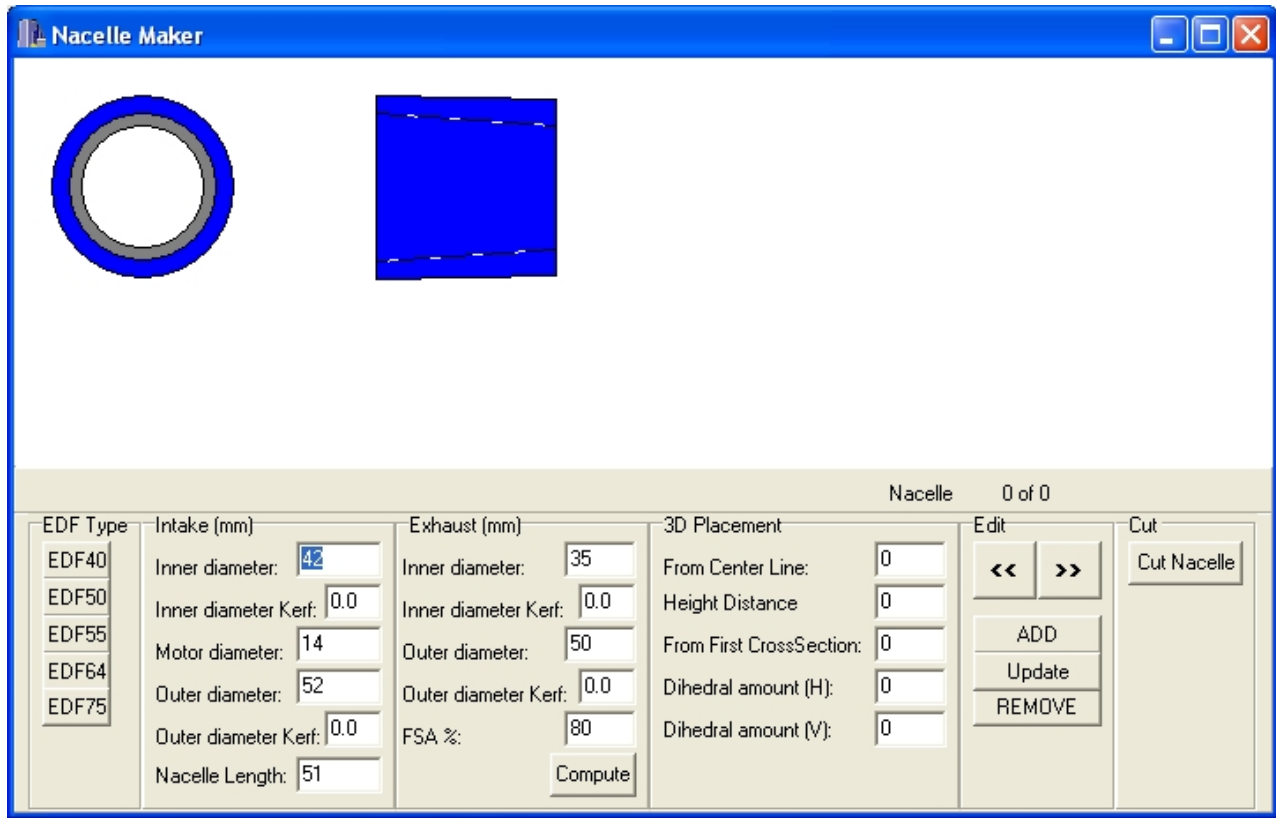
Get Statistics Button

Press the Get Statistics button to find out the amount of travel needed to cut the selected wing as well as the stock size needed. When this button is pressed the CNC window is closed to speed up processing time.

Cut Wing Button

Press the Cut Wing button to cut or simulate the cut of the selected wing. The Wings tab in the CNC window becomes active and the cut starts immediately.

Nacelle Maker Window



Nacelle Profile Image

The Nacelle Profile image window shows a front view and side view representation of your nacelle. The image is adjusted as you change parameters in the data fields. You can use multiple nacelle sections to make one. As an example you can make a tube section for the Electric Ducted Fan (referred as EDF throughout the TJZOIDE software) with the same intake inner diameter and exhaust inner diameter and then another section with a tapered inner tube.

Information Panel

Nacelle id and Count Caption

The Nacelle ID caption displays the nacelle ID (number) and nacelle count for the selected nacelle in the airplane.

EDF Type Panel

EDF40 Button

Pressing the **EDF40** button loads the data fields with predefined information for a 40mm size EDF. Depending on your model and EDF you might need to change these values.

EDF50 Button

Pressing the **EDF50** button loads the data fields with predefined information for a 50mm size EDF. Depending on your model and EDF you might need to change these values.

EDF55 Button

Pressing the **EDF55** button loads the data fields with predefined information for a 55mm size EDF. Depending on your model and EDF you might need to change these values.

EDF64 Button

Pressing the **EDF64** button loads the data fields with predefined information for a 64mm size EDF. Depending on your model and EDF you might need to change these values.

EDF75 Button

Pressing the **EDF75** button loads the data fields with predefined information for a 75mm size EDF. Depending on your model and EDF you might need to change these values.

Intake Panel

Intake Inner Diameter Field

Enter the desired Intake Inner nacelle diameter in this field.

Intake Inner Diameter Kerf Field

Enter the desired Intake Inner nacelle diameter kerf compensation in this field. Positive Numbers reduce the diameter of the cut, while negative numbers increase it.

Motor Diameter Field

Enter the motor diameter in this field. This field is used to compute the exhaust inner diameter as a percentage of Fan Sweep Area (FSA%) when the Compute button is pressed.

Intake Outer Diameter Field

Enter the desired Intake Outer nacelle diameter in this field.

Intake Outer Diameter Kerf Field

Enter the desired Intake Outer nacelle diameter kerf compensation in this field. Positive Numbers increase the diameter of the cut, while negative numbers decrease it.

Nacelle Length Field

Enter the desired nacelle Length in this field.

Exhaust Panel

Exhaust Inner Diameter Field

Enter the desired Exhaust Inner nacelle diameter in this field.

Exhaust Inner Diameter Kerf Field

Enter the desired Exhaust Inner nacelle diameter kerf compensation in this field. Positive Numbers reduce the diameter of the cut, while negative numbers increase it.

Exhaust Outer Diameter Field

Enter the desired Exhaust Outer nacelle diameter in this field.

Exhaust Outer Diameter Kerf Field

Enter the desired Exhaust Outer nacelle diameter kerf compensation in this field. Positive Numbers increase the diameter of the cut, while negative numbers decrease it.

Fan Sweep Area Percentage Field

Enter the percentage of Fan Sweep Area (FSA%) that you want to use when the Compute button is pressed.

Compute Inner Diameter Button

The Inner Exhaust diameter field is adjusted when this button is pressed. Intake Inner diameter, Motor Diameter and FSA% are used to compute Exhaust Inner Diameter when this button is pressed.

3D Placement Panel

From Center Line Field

The **From Center Line** field specifies the distance horizontally where this nacelle is located relative to the airplane center line.

Height Distance Field

The **Height** field specifies the distance vertically where this nacelle is located relative to the airplane center line.

From First Cross Section Field

The **From First Cross Section** field specifies the distance from the front (nose) of the airplane towards the back where this nacelle is located.

Vertical Dihedral amount Field

The **Vertical Dihedral** amount field specifies the vertical offset of the nacelle exhaust relative to the nacelle intake.

Horizontal Dihedral amount Field

The **Horizontal Dihedral** amount field specifies the horizontal offset of the nacelle exhaust relative to the nacelle intake.

Edit Panel

Previous Nacelle Button

The **Previous** Nacelle button selects the previous nacelle in your airplane design.

Next Nacelle Button

The **Next** Nacelle button selects the next nacelle in your airplane design.

Add Nacelle Button

After you have entered all the nacelle information such as intake inner diameter, intake exhaust diameter, motor diameter, exhaust inner and outer diameter as well as 3D location in the various Nacelle Maker window fields, press the ADD button so that the nacelle is added to your design..

Update Nacelle Button

If after you have added a nacelle you decide to make changes, update all the pertinent fields in the Nacelle Maker window and press the UPDATE button. Press this button rather than the ADD button when making changes. If you press the add button a new nacelle will get created.

Remove Nacelle Button

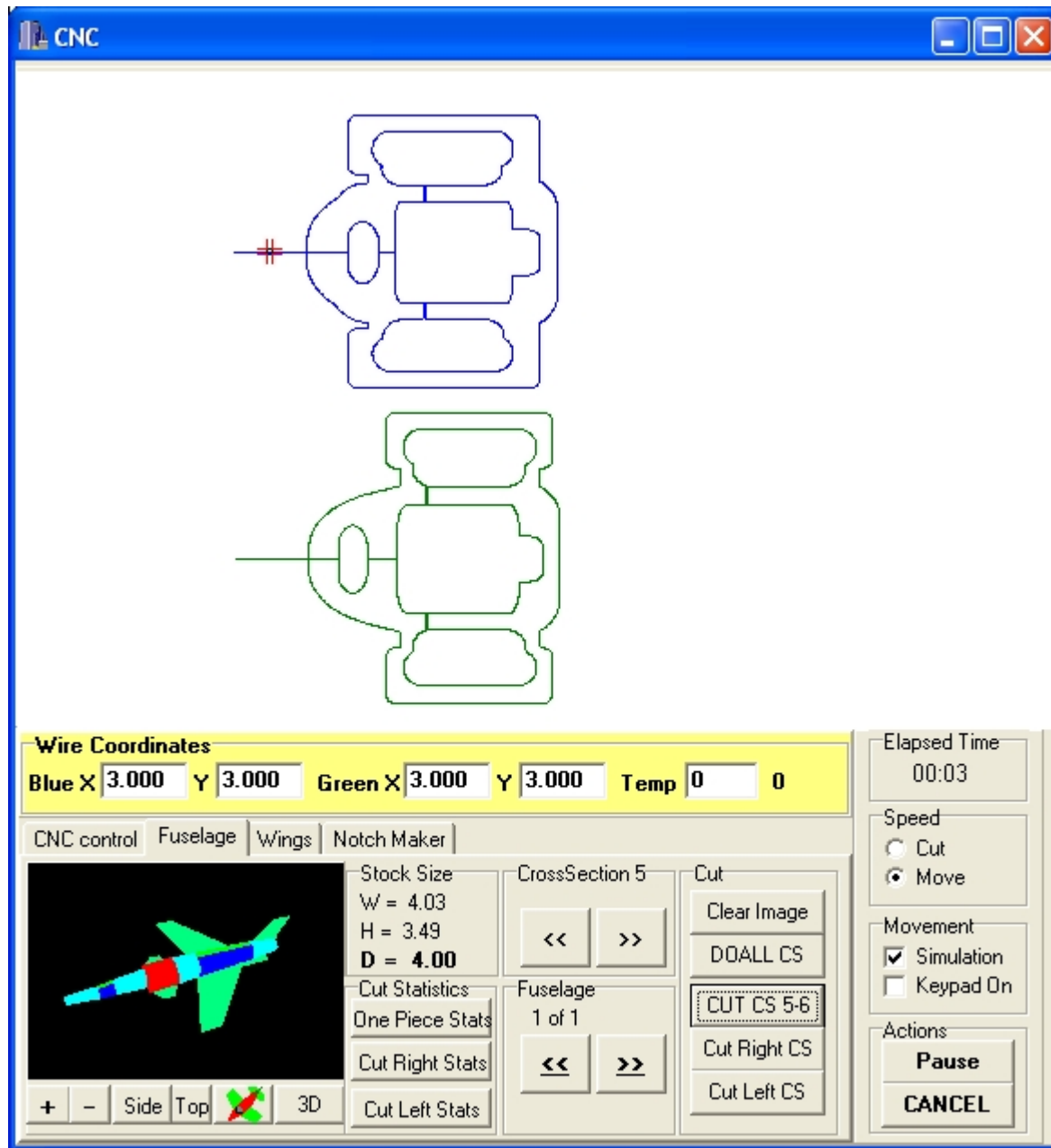
The REMOVE nacelle button removes the current nacelle from your airplane design. This cannot be undone.

Cut Panel

Cut Nacelle Button

When the Cut Nacelle button is pressed the current nacelle is cut. A 1/2 inch or 1 cm leading is always used between the wire and the foam block. You **MUST** align the wire vertically with the center of the foam block to be used. Also the center of the wire (horizontally) **MUST** match the center of the nacelle length. Please note that the Simulation check box in the CNC Screen must be cleared in order to cut a nacelle.

CNC Window



Wire Travel Image

The Wire Travel Image draws in the screen how the wire moves to conform to the cross section shapes used for a fuselage part or wing. Please note that while shapes look just fine when in profile simulation mode, they will be distorted when making a real cut. Profile simulation mode can be selected in the General tab of the Configuration window. It is encouraged to use this mode to verify the cut that will be made is the one that you want. In simple words if it does not look right **while in profile simulation mode**, it will NOT cut right for real. Once again, while cutting the part the image WILL be distorted, possibly go off screen and will not look anything like the intended shape. This is because the wire movement is projected to the tower location which do not match the edge of the foam block.

Blue Tower Travel Image Section

The wire movement of the right tower (your right when looking at your CNC machine) is drawn in Blue – therefore the reference throughout the TJZOIDE program to “Blue” (XBlue, YBlue-etc.). This tower cuts the shape of the next cross section used in making this fuselage part section.

Green Tower Travel Image Section

The wire movement of the left tower (your left when looking at your CNC machine) is drawn in Green – therefore the reference throughout the TJZOIDE program to “Green” (XGreen, YGreen-etc.). This tower cuts the shape of the current cross section used in making this fuselage part section.

Wire Coordinates Panel

Blue X Position Field

This field displays the travel in inches or mm in the forward/back direction of the Blue tower. This is NOT an absolute position, and is used for relative reference. It is reset when the Clear Image button is pressed independent of where the actual tower is located.

Blue Y Position Field

This field displays the travel in inches or mm in the up/down direction of the Blue tower. This is NOT an absolute position, and is used for relative reference. It is reset when the Clear Image button is pressed independent of where the actual tower is located.

Green X Position Field

This field displays the travel in inches or mm in the forward/back direction of the Green tower. This is NOT an absolute position, and is used for relative reference. It is reset when the Clear Image button is pressed independent of where the actual tower is located.

Green Y Position Field

This field displays the travel in inches or mm in the up/down direction of the Green tower. This is NOT an absolute position, and is used for relative reference. It is reset when the Clear Image button is pressed independent of where the actual tower is located.

Temperature Position Field

This field displays the travel in degrees (**angle NOT F, or C degrees**) of the temperature adjustment stepper motor or solid state temperature control board. Unfortunately there can be some confusion because the term degree is the same work for angles and for temperature. In TJZOIDE it can be understood as the position of a dial rotating through and angle range. This only occurs when the temperature control feature is configured and enabled in the Configuration window.

Elapsed Time Panel

The Elapsed Time panel displays minutes and seconds as an operation takes place. In some situations, the elapsed time resets to 0 and then continues from where it started. The time displayed at the end of a cut is the correct elapsed time.

Speed Panel

Cut Radio Button

When this radio button is selected, CNC Control tab moves and keypad moves occur at the Fuselage cut speed specified in the Feedrates tab of the configuration window.

Move Radio Button

When this radio button is selected, CNC Control tab moves and keypad moves occur at the Move speed specified in the Feedrates tab of the configuration window.

Movement Panel

Simulation Check Box

When the **Simulation** check box is checked the program is in cut simulation mode. No commands are sent to the machine and timing is accelerated to perform as fast as your system allows. With this mode you can preview how the part would be cut. Please note that when the profile simulation check box in the General tab of the configuration window is checked, the bit path shown in the screen should match your design. However, when the actual cut is done with the simulation flag cleared, the bit path will be different, deformed and most likely unrecognizable. This is because when the real cut is done, the wire moves to where the image projects a distance away from the actual cut. This is correct and as designed.

Keypad On Check Box

When the **Keypad On** check box is checked you can use various keys to move the various axes in your cnc machine. Keep in mind that the simulation check box determines if the commands are sent to the machine. If the simulation check box is checked the screen will show movement but the machine will not move.

The Keypad On check box is automatically cleared in certain cases such as when you are using the keyboard or numeric keypad to enter data.

The Keypad On check box is automatically checked when you are cutting a part so that some features are enabled, such as pausing or cancelling a cut. Refer to the Keyboard HotKeys section for more information.

Keyboard Hot Keys

NOTE: For the Keyboard Hot keys to work, keyboard focus must remain in the CNC screen window. If you move away to another window, these hot keys will NOT work. **In general, when you are cutting a part, you should NOT use the machine for anything else.** Windows operating systems pauses many events when the user is opening or moving windows which can adversely affect your cut. Let it finish before using the machine for anything else.

* - toggles the Keypad On check box.

/ - toggles the simulation check box

+ - select the Move speed – sets the Move Radio button

- - select the Cut speed – sets the Cut Radio button

Up Arrow key – moves both Blue and Green towers UP simultaneously.

Down Arrow key – moves both Blue and Green towers DOWN simultaneously.

Left Arrow key – moves both Blue and Green towers BACK simultaneously.

Right Arrow key – moves both Blue and Green towers FORWARD simultaneously.

8 – moves the Blue tower UP.

2 – moves the Blue tower DOWN.

4 – moves the Blue tower BACK.

6 – moves the Blue tower FORWARD.

5 – moves the Green tower UP.

0 – moves the Green tower DOWN.

1 – moves the Green tower BACK.

3 – moves the Green tower FORWARD.

. – the period pauses the cut. A requester dialog box comes up in the screen to continue or cancel the cut

I – the letter I increases the temperature control angle position. You can use this key while the cut is in progress if you notice the wire is bowing due to a low temperature condition. Temperature control feature has to be configured and enabled for this feature to work properly.

D – the letter D decreases the temperature control angle position. You can use this key while the cut is in progress if you notice the wire is too hot and the foam is melting too fast. Temperature control feature has to be configured and enabled for this feature to work properly.

M – the letter M selects the Move speed – sets the Move Radio button

C – the letter C selects the Cut speed – sets the Cut Radio button

S – the letter S toggles the simulation check box

H – the letter H moves the temperature control to the High temp position. Temperature control feature has to be configured and enabled for this feature to work properly.

L – the letter L moves the temperature control to the Low temp position. Temperature control feature has to be configured and enabled for this feature to work properly.

O – the letter O moves the temperature control to the Off temp position. Temperature control feature has to be configured and enabled for this feature to work properly.

K – the letter K toggles the Keypad On check box

Home key – the home key moves the towers to the previously store home location. A requester dialog box comes up in the screen to confirm or cancel this move.

END key – the end key immediately cancels the cut in progress and turns of the wire if the temperature control feature is configured and enabled.

Page Up key – the page up key moves the towers up by the configured amount in the Machine Parameters tab of the Configuration window.

Page Down key – the page down key moves the towers down by the configured amount in the Machine Parameters tab of the Configuration window.

Actions Panel

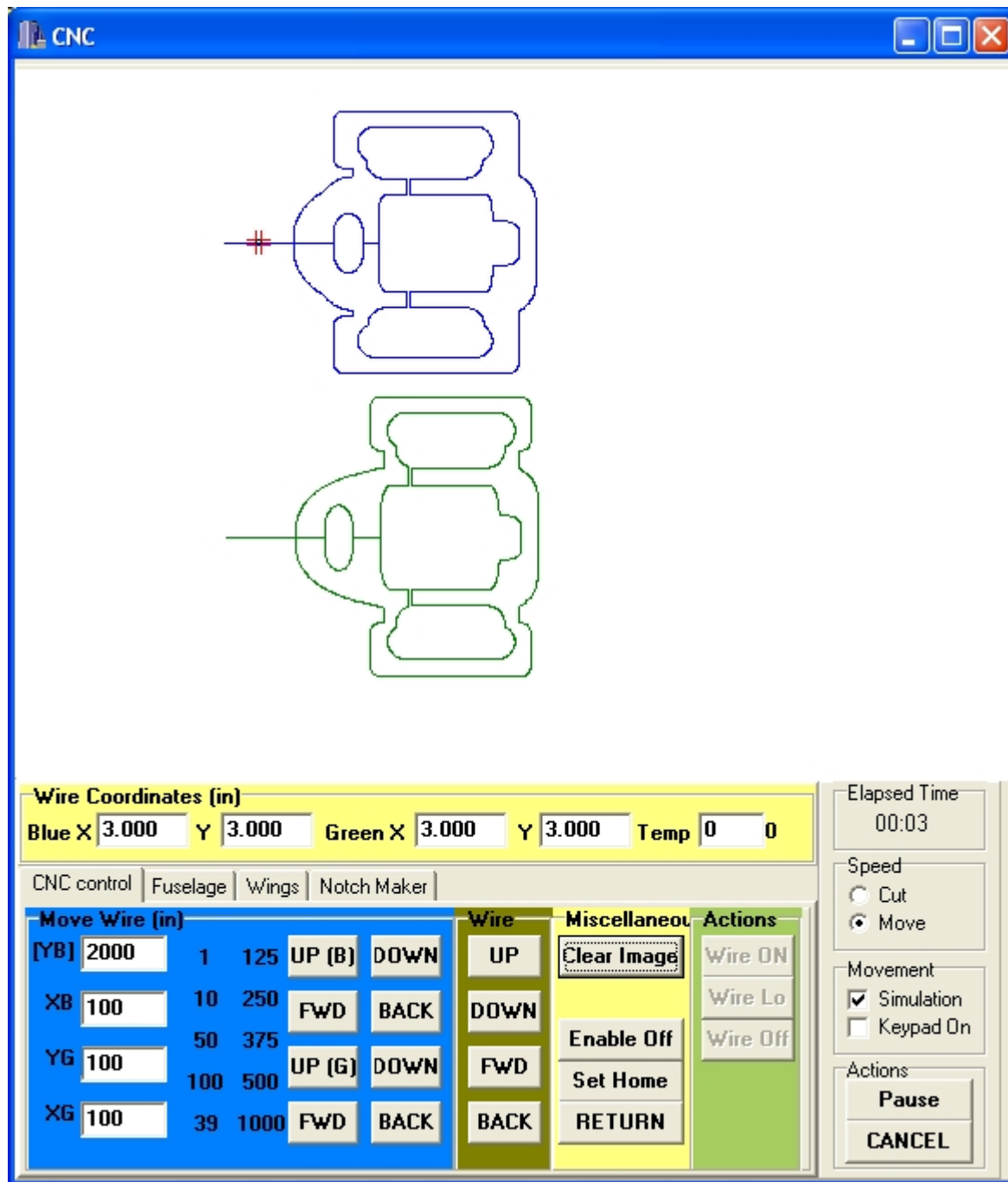
Pause Button

When the **Pause** button is pressed, any movement in progress is paused, a dialog requester comes up in the screen to continue or cancel the cut. **Be advised that the wire remains in the current temp position. This means that if the wire was on it will remain on.**

Cancel Button

When the **CANCEL** button is pressed all movement is stopped and the wire is turned off. There is no confirmation requested for this feature. **Once you press CANCEL there is no way to continue your cut.**

CNC Window – CNC control Tab



Move Wire Panel

[YB] Data Entry

This field is used to specify the amount of travel you want the Blue tower to move up or down when pressing the UP(B)/DOWN buttons in thousands of an inch or mm. We chose to specify this amount in thousands of an inch so you do not have to enter the period “.” When entering travel amounts. 1000 in this field means 1 inch. When operating in metric mode, values are specified in mm. This field is also used to specify a custom amount to move in the Wire panel move buttons. Therefore the square brackets

around it to highlight this feature. This value is only active when you click in this field and TJZOIDE has focus this field. Pressing other fields or buttons loses focus.

XB Data Entry

This field is used to specify the amount of travel you want the Blue tower to move forward or back when pressing the FWD/BACK buttons in thousands of an inch or mm. We chose to specify this amount in thousands of an inch so you do not have to enter the period “.” When entering travel amounts. 1000 in this field means 1 inch. When operating in metric mode, values are specified in mm. This value is only active when you click in this field and TJZOIDE has focus this field. Pressing other fields or buttons loses focus.

YG Data Entry

This field is used to specify the amount of travel you want the Green tower to move up or down when pressing the UP(G)/DOWN buttons in thousands of an inch or mm. We chose to specify this amount in thousands of an inch so you do not have to enter the period “.” When entering travel amounts. 1000 in this field means 1 inch. When operating in metric mode, values are specified in mm. This value is only active when you click in this field and TJZOIDE has focus this field. Pressing other fields or buttons loses focus.

YB Data Entry

This field is used to specify the amount of travel you want the Green tower to move forward or back when pressing the FWD/BACK buttons in thousands of an inch or mm. We chose to specify this amount in thousands of an inch so you do not have to enter the period “.” When entering travel amounts. 1000 in this field means 1 inch. When operating in metric mode, values are specified in mm. This value is only active when you click in this field and TJZOIDE has focus this field. Pressing other fields or buttons loses focus.

Speed Buttons

Various popular dimensions have been added as speed buttons so you do not have to enter specific amounts every time you need to move a tower. Please note that other features such as the Home feature as well as **the Keypad On** feature allows you to move the towers using the numeric keypad and arrow keys in a much easier, but less precise way.

Inch mode Speed Buttons

1 Button

This Speed button specifies that you want to move 1 thousand of an inch (0.001 inch) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

10 Button

This Speed button specifies that you want to move 10 thousands of an inch (0.010 inch) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

50 Button

This Speed button specifies that you want to move 50 thousands of an inch (0.050 inch) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

100 Button

This Speed button specifies that you want to move 100 thousands of an inch (0.100 inch) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

39 Button

This Speed button specifies that you want to move 39 thousands of an inch (0.039 inch – **approximately 1 millimeter**) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

125 Button

This Speed button specifies that you want to move 125 thousands of an inch (1/8 inch) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

250 Button

This Speed button specifies that you want to move 250 thousands of an inch (1/4 inch) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

375 Button

This Speed button specifies that you want to move 375 thousands of an inch (3/8 inch) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

500 Button

This Speed button specifies that you want to move 500 thousands of an inch (1/2 inch) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

1000 Button

This Speed button specifies that you want to move 1000 thousands of an inch (1 inch) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

Metric mode Speed Buttons

0.01 Button

This Speed button specifies that you want to move 1 hundredth of a millimeter (0.01 mm) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

0.02 Button

This Speed button specifies that you want to move 2 hundredth of a millimeter (0.02 mm) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

0.05 Button

This Speed button specifies that you want to move 5 hundredth of a millimeter (0.05 mm) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

0.1 Button

This Speed button specifies that you want to move 10 hundredth of a millimeter (0.1 mm) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

0.2 Button

This Speed button specifies that you want to move 20 hundredth of a millimeter (0.2 mm) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

0.5 Button

This Speed button specifies that you want to move 50 hundredth of a millimeter (0.5 mm) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

1.0 Button

This Speed button specifies that you want to move 1 millimeter (1.0mm) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

2.0 Button

This Speed button specifies that you want to move 2 millimeter (2.0mm) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

10.0 Button

This Speed button specifies that you want to move 10 millimeter (10.0mm) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

20.0 Button

This Speed button specifies that you want to move 20 millimeter (20.0mm) when pressing any of the tower movement UP/DOWN/FWD/BACK buttons. The button is highlighted when selected to indicate the current selection.

Blue Tower Move Buttons

The tower move buttons allow you to move independent axis by the amount specified in the fields horizontally aligned with each button or by the amount selected using Speed Buttons described above.

Up(B) Button – horizontally aligned with [YB] field

Move the Blue tower UP by the amount specified in the Move Wire panel [YB] field or by the amount selected with Speed Buttons.

Down Button – horizontally aligned with [YB] field

Move the Blue tower DOWN by the amount specified in the Move Wire panel [YB] field or by the amount selected with Speed Buttons.

FWD Button – horizontally aligned with XB field

Move the Blue tower FORWARD by the amount specified in the Move Wire panel XB field or by the amount selected with Speed Buttons.

Back Button – horizontally aligned with XB field

Move the Blue tower BACK by the amount specified in the Move Wire panel XB field or by the amount selected with Speed Buttons.

Green Tower Move Buttons

The tower move buttons allow you to move independent axis by the amount specified in the fields horizontally aligned with each button or by the amount selected using Speed Buttons described above.

Up(G) Button – horizontally aligned with YG field

Move the Green tower UP by the amount specified in the Move Wire panel YG field or by the amount selected with Speed Buttons.

Down Button – horizontally aligned with YG field

Move the Green tower DOWN by the amount specified in the Move Wire panel YG field or by the amount selected with Speed Buttons.

FWD Button – horizontally aligned with XG field

Move the Green tower FORWARD by the amount specified in the Move Wire panel XG field or by the amount selected with Speed Buttons.

Back Button – horizontally aligned with XG field

Move the Green tower BACK by the amount specified in the Move Wire panel XG field or by the amount selected with Speed Buttons.

Wire Panel

Up Button

Move both Blue and Green tower simultaneously UP by the amount specified in the Move Wire panel [YB] field or by the amount selected with Speed Buttons.

Down Button

Move both Blue and Green tower simultaneously DOWN by the amount specified in the Move Wire panel [YB] field or by the amount selected with Speed Buttons.

FWD Button

Move both Blue and Green tower simultaneously FORWARD by the amount specified in the Move Wire panel [YB] field or by the amount selected with Speed Buttons.

Back Button

Move both Blue and Green tower simultaneously BACK by the amount specified in the Move Wire panel [YB] field or by the amount selected with Speed Buttons.

Miscellaneous Panel

Clear Image Button

The Clear Image button clears the Wire Travel image and resets the wire coordinates in the screen. There is a feature to automatically clear this image when a fuselage part section or wing is cut. This option is set in the General tab of the Configuration window.

Set Home Button

When this button is pressed the current physical location of the towers is stored in memory and saved when the program is closed. This location is used by the RETURN button.

Return Button

When the RETURN button is pressed the towers move to the previously saved home location.

Actions Panel

Wire On Button

When temperature control is configured and enabled, this turns the wire on to the High temp location.

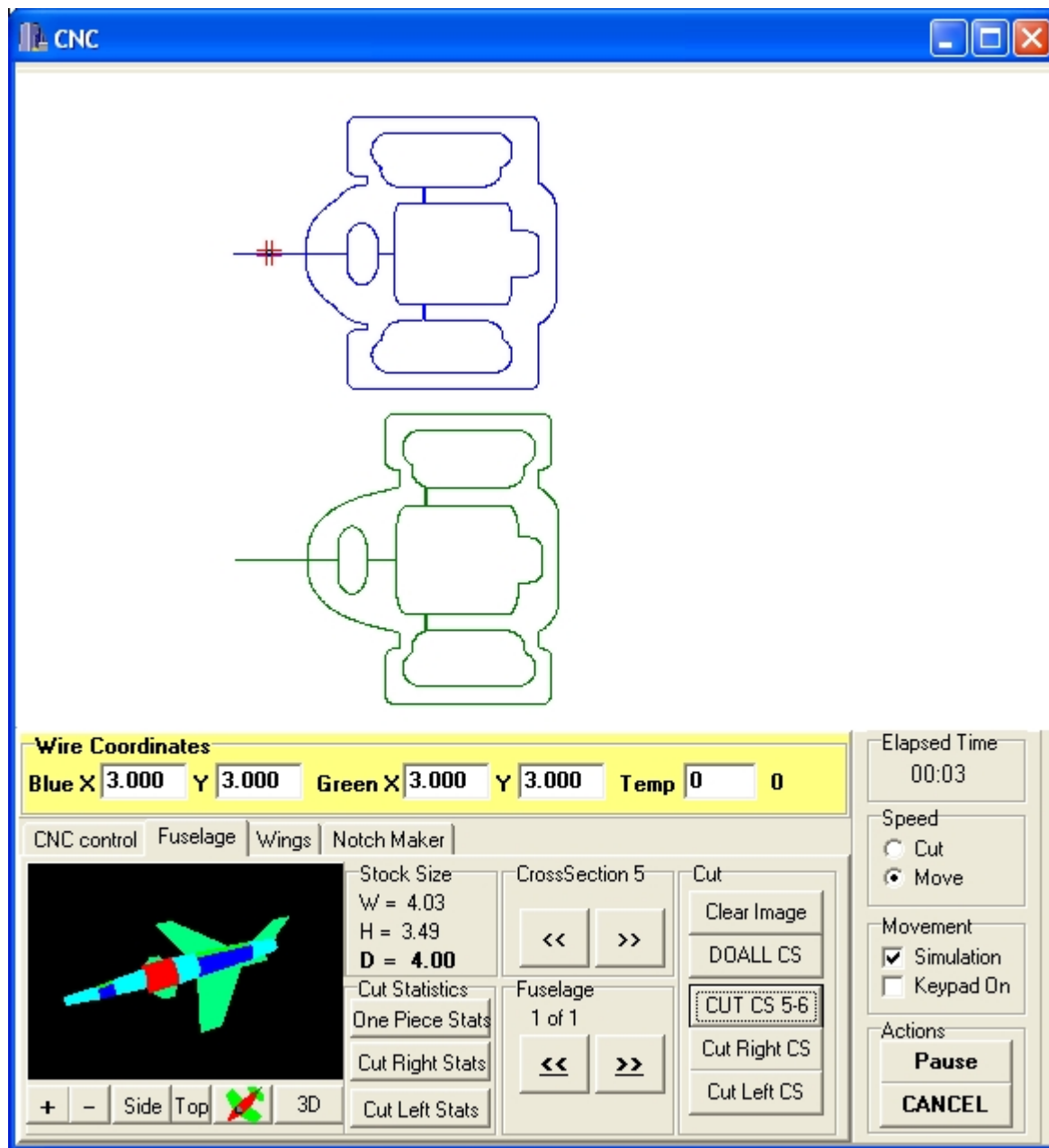
Wire Lo Button

When temperature control is configured and enabled, this turns the wire on to the Low temp location.

Wire Off Button

When temperature control is configured and enabled, this turns the wire to the Off temp location.

CNC Window - Fuselage Tab



3D View Panel

3D Image

The 3D image window shows a 3D representation of your model. The fuselage part section being selected is highlighted in the 3D image by drawing it Red. In order to view this representation you have to first press the 3D render button. This step is left to be done manually because rendering 3D images is a CPU intensive process that can negatively affect program performance.

+ Zoom Button

Enlarges the 3D image view, zooms in.

- Zoom Button

Reduces the 3D image view, zooms out.

Side View Button

Rotates the airplane view so that a side view of the model is displayed.

Top View Button

Rotates the airplane view so that a top view of the model is displayed.

Aspect View Button

Rotates the airplane view so that an aspect view of the model is displayed.

3D Render Button

The **Render 3D Model** button creates a 3D view of the airplane including all wings and nacelles by using all cross sections and all fuselage parts. All 3D windows get updated when this button is pressed.

Stock Size Panel

Width

The Stock Size Width Caption displays the maximum width of the fuselage part section selected. This is the maximum amount that the wire will travel in the UP/DOWN direction inside the foam block to cut the part.

Height

The Stock Size Height Caption displays the maximum height of the fuselage part section selected. . This is the maximum amount that the wire will travel in the FORWARD/BACK direction inside the foam block to cut the part. Please note that by convention ALL cuts have a 1/2 inch lead-in into the part (1cm in metric mode). This 1/2 inch (1 cm) is not included in the Height dimension

Depth

The Stock Size Depth Caption displays the distance between cross sections of the fuselage part section selected.

Cut Statistics Panel

One Piece Stats Button

The **One Piece Stats** button computes the maximum travel needed to cut the selected fuselage part using a single block of foam. A warning is issued if the machine capacity as configured in the Machine Parameters tab on the Configuration form are exceeded.

Cut Right Stats Button

The **Cut Right Stats** button computes the maximum travel needed to cut the right side of the selected fuselage part. A warning is issued if the machine capacity as configured in the Machine Parameters tab on the Configuration form are exceeded.

Cut Left Stats Button

The **Cut Left Stats** button computes the maximum travel needed to cut the left side of the selected fuselage part. A warning is issued if the machine capacity as configured in the Machine Parameters tab on the Configuration form are exceeded.

Cross Section Panel

Cross Section ID Caption

The Cross Section ID caption indicates the front cross section id of the selected fuselage section for the selected fuselage

Previous Cross Section Part Button

This button selects the previous fuselage section for the selected fuselage.

Next Cross Section Part Button

This button selects the next fuselage section for the selected fuselage.

Fuselage Part Panel

Fuselage ID Caption

The Fuselage panel caption displays the fuselage ID along with the fuselage count of your airplane design.

Previous Fuselage Part Button

The **Previous** fuselage button navigates back to the previous fuselage part. The Fuselage ID and count caption in the information panel specifies which fuselage is active

Next Fuselage Part Button

The **Next** fuselage button navigates forward to the next fuselage part. The Fuselage ID and count caption in the information panel specifies which fuselage is active.

Cut Panel

Clear Image Button

The Clear Image button clears the Wire Travel image and resets the wire coordinates in the screen. There is a feature to automatically clear this image when a fuselage part section or wing is cut. This option is set in the General tab of the Configuration window.

Do All CS Button

The DO All CS button prepares the current fuselage part using the current and next cross sections. Error checking is done at this point and allows you to verify the part is ready to be cut.

Cut from one piece Button

The **Cut from one piece** button opens the CNC window and cuts both sides of the current fuselage part. It also prepares the current fuselage part using the current and next cross sections if needed as if the DOALL CS button had been pressed. This feature allows to cut fuselage parts from one foam block. As an example you can cut a 3.5” wide fuselage part from a 4” foam block. When cutting from one piece you **MUST** align the cutting wire with the **center** height of the foam board.

Cut Right Side Button

The **Cut Right Side** button opens the CNC window and cuts the right side of the current fuselage part. It also prepares the current fuselage part using the current and next cross sections if needed as if the DOALL CS button had been pressed. This feature allows to cut fuselage parts with thinner foam sheets. As an example you can cut a 3.5” wide fuselage part as a 1.75” left side and a 1.75” right side from a 2” extruded foam insulation board you can buy at most hardware stores.

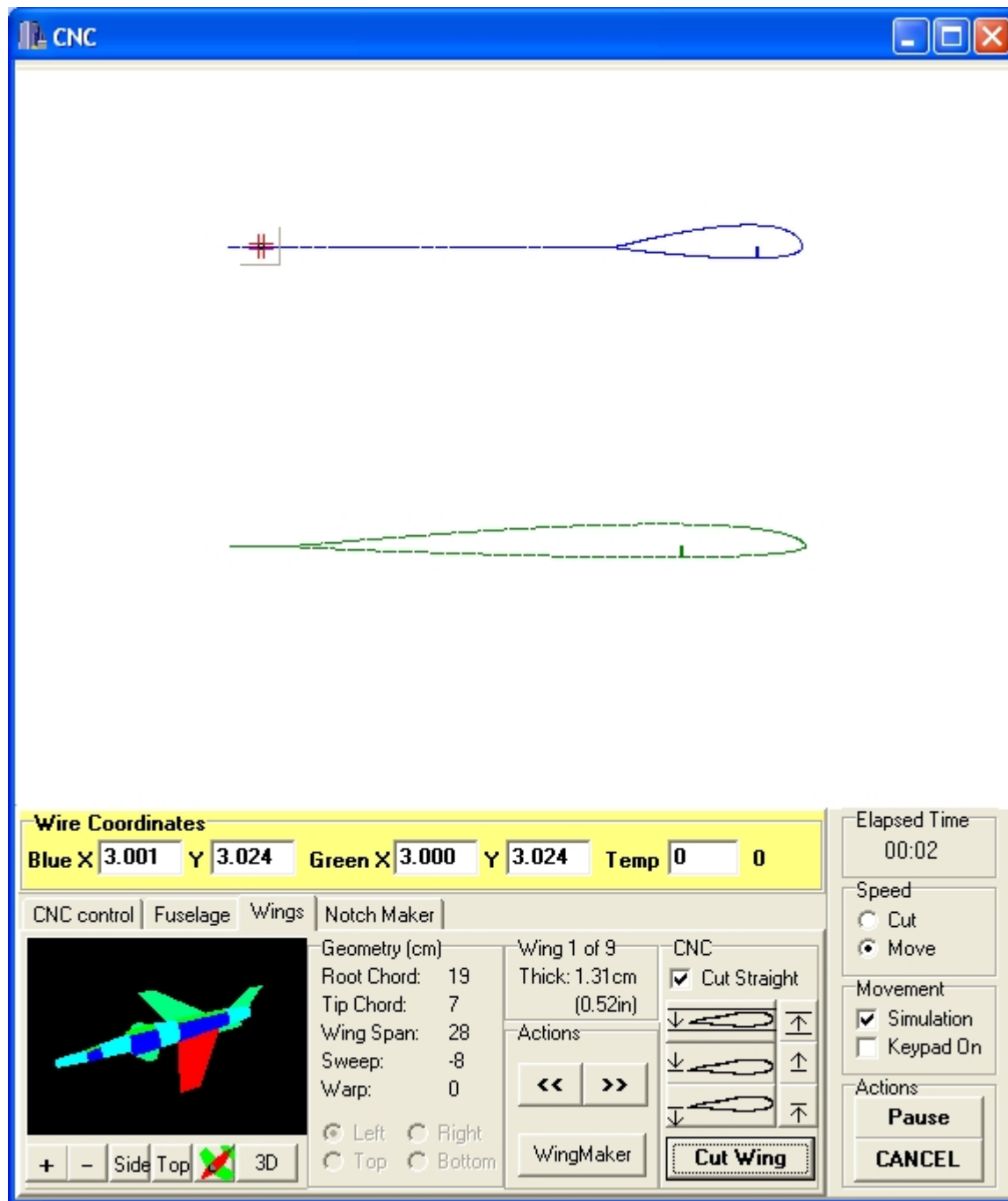
When cutting right sides you **MUST** align the cutting wire with the **bottom** edge of the foam board.

Cut Left Side Button

The **Cut Left Side** button opens the CNC window and cuts the left side of the current fuselage part. It also prepares the current fuselage part using the current and next cross sections if needed as if the DOALL CS button had been pressed. This feature allows to cut fuselage parts with thinner foam sheets. As an example you can cut a 3.5” wide fuselage part as a 1.75” left side and a 1.75” right side from a 2” extruded foam insulation board you can buy at most hardware stores.

When cutting left sides you **MUST** align the cutting wire with the **top** edge of the foam board.

CNC Window - Wings Tab



3D View Panel

3D Image

The 3D image window shows a 3D representation of your model. The wing being selected is highlighted in the 3D image by drawing it Red. In order to view this representation you have to first press the 3D render button. This step is left to be done manually because rendering 3D images is a CPU intensive process that can negatively affect program performance.

+ Zoom Button

Enlarges the 3D image view, zooms in.

- Zoom Button

Reduces the 3D image view, zooms out.

Side View Button

Rotates the airplane view so that a side view of the model is displayed.

Top View Button

Rotates the airplane view so that a top view of the model is displayed.

Aspect View Button

Rotates the airplane view so that an aspect view of the model is displayed.

3D Render Button

The **Render 3D Model** button creates a 3D view of the airplane including all wings and nacelles by using all cross sections and all fuselage parts. All 3D windows get updated when this button is pressed.

Geometry Panel

The geometry panel displays wing dimensions information for the selected wing. These are informational fields and cannot be edited. To change wing dimensions use the Wing Maker tool and update the wing once changes are made.

Root Chord Caption

The Root Chord caption displays the dimension of the wing at the root of the selected wing.

Tip Chord Caption

The Tip Chord caption displays the dimension of the wing at the wing tip of the selected wing.

Wing Span Caption

The Wing Span caption displays the dimension of the wing span for the selected wing.

Sweep Caption

The Sweep caption displays the setback distance between the leading edge of the root chord and the leading edge of the tip chord of the wing for the selected wing.

Warp Caption

The Warp Caption displays the distance between the wingtip leading edge from a level position for the selected wing.

Left Wing Radio Button

The Left Wing radio button is set when the selected wing is a left wing.

Right Wing Radio Button

The Right Wing radio button is set when the selected wing is a right wing.

Rudder Wing Radio Button

The Rudder Wing radio button is set when the selected wing is a ruder that points up.

Bottom Rudder Wing Radio Button

The Bottom Rudder Wing radio button is set when the selected wing is a ruder that points down.

Wing ID Panel

The Wing ID panel displays the wing ID (number) and wing count for the selected wing in the airplane.

Wing Thickness Caption

The Wing Thickness caption display the maximum wing thickness for the selected wing.

Actions Panel

Previous Wing Button

The Previous Wing button selects the previous wing in your airplane design. The 3D image screen is updated to highlight the window and the wing ID and count caption is updated.

Next Wing Button

The Next Wing button selects the next wing in your airplane design. The 3D image screen is updated to highlight the window and the wing ID and count caption is updated.

Wing Maker Button

The **Wing Maker** button opens the Wing Maker window. The Wing Maker window is used to add and modify wings to your airplane design. This window is discussed later in this document.

CNC Panel

Cut Straight Check Box

Use the Cut Wing Straight check box to cut sweep wings. The wing is laid out in such a way that a minimum amount of material is used by extending the wingspan while shortening the root and wingtip chord. After the wing is cut, you will have to manually make an angled cut to match your wing design. It is highly recommended to use this feature to keep the travel distances of your machine to a minimum. Some wings would otherwise require extreme travels that would make it impossible to cut in most hobbyist CNC machines.

The Move wire Buttons allow you to cut similar wings from the same foam stock by moving the wire up or down the appropriate amount for the cut.

Move Wire Down wing thickness Button

Move the wire down the thickness of the current wing plus configured clearance. Use this button when you are cutting a second wing below the wing just cut.

Move Wire Up wing thickness Button

Move the wire up the thickness of the current wing plus configured clearance.

Move Wire Down top wing thickness Button

Move the wire down the top half thickness of the wing plus configured clearance. Align the wire to the top of the foam stock. Select the wing you want to cut. Press this button to move the wire down to the appropriate entry point.

Move Wire Up top wing thickness Button

Move the wire up the top half thickness of the wing plus configured clearance.

Move Wire Down Bottom wing thickness Button

Move the wire down the bottom half thickness of the wing plus configured clearance.

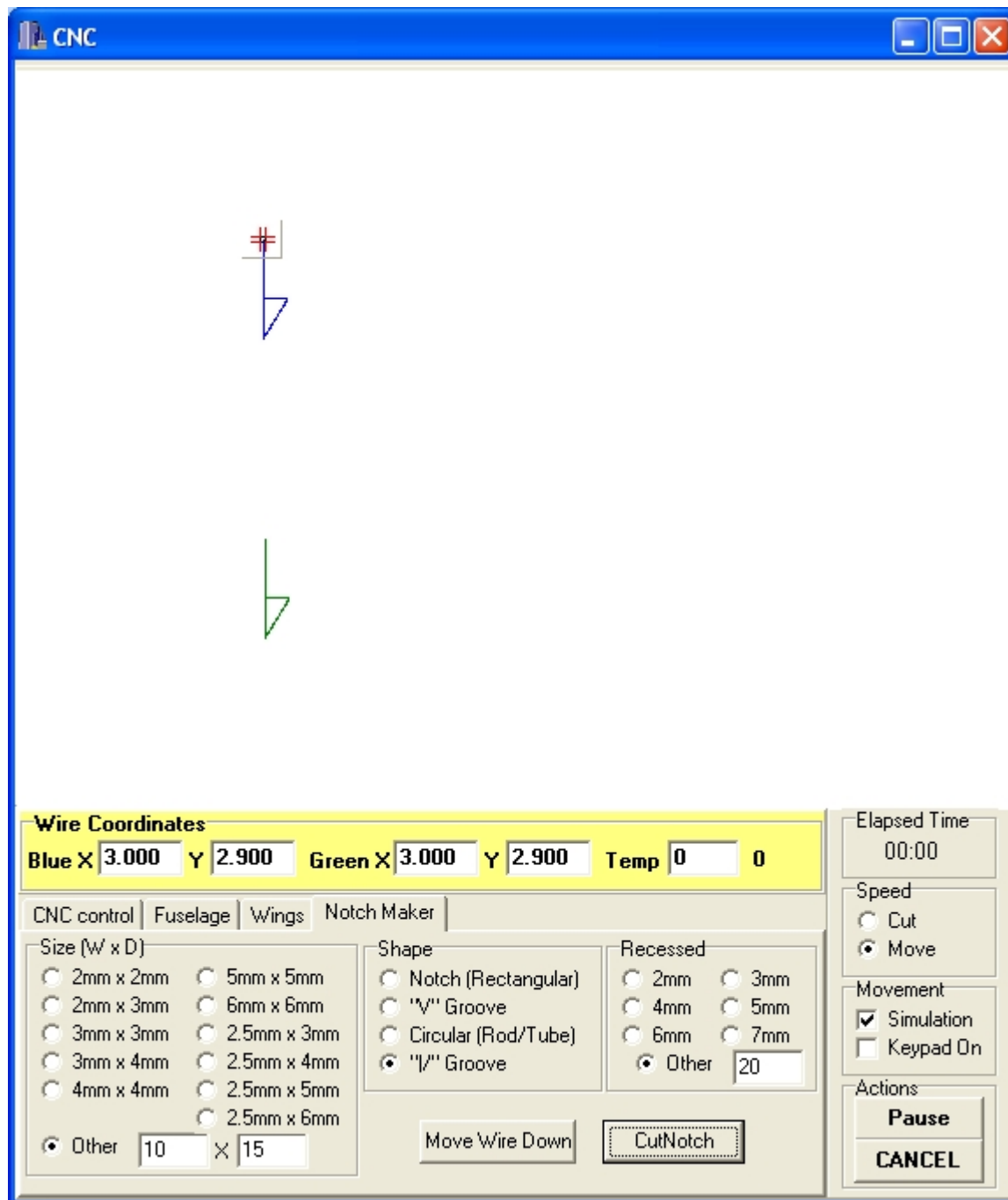
Move Wire Up Bottom wing thickness Button

Move the wire up the bottom half thickness of the wing plus configured clearance.

Cut Wing Button

Press the Cut Wing button to cut or simulate the cut of the selected wing. The Wings tab in the CNC window becomes active and the cut starts immediately.

CNC Window - Notch Maker Tab



Size Panel

Please note that due to way too many factors these settings might not produce the exact amount you desire. Wire, temperature, federate speed, material amount, wing shape and thickness among other things make this a very challenging cut. You should practice, fine tune and get to know your machine when using this feature. In many instances this stand alone Notch Maker tool produces better results after the wings are cut.

2mm x 2mm Radio Button

This radio button specifies a notch 2mm wide by 2mm high.

2mm x 3mm Radio Button

This radio button specifies a notch 2mm wide by 3mm high.

3mm x 3mm Radio Button

This radio button specifies a notch 3mm wide by 3mm high.

3mm x 4mm Radio Button

This radio button specifies a notch 3mm wide by 4mm high.

4mm x 4mm Radio Button

This radio button specifies a notch 4mm wide by 4mm high.

5mm x 5mm Radio Button

This radio button specifies a notch 5mm wide by 5mm high.

6mm x 6mm Radio Button

This radio button specifies a notch 6mm wide by 6mm high.

2.5mm x 3mm Radio Button

This radio button specifies a notch 2.5mm wide by 3mm high.

2.5mm x 4mm Radio Button

This radio button specifies a notch 2.5mm wide by 4mm high.

2.5mm x 5mm Radio Button

This radio button specifies a notch 2.5mm wide by 5mm high.

2.5mm x 6mm Radio Button

This radio button specifies a notch 2.5 mm wide by 6mm high.

Other Radio Button

This radio button specifies a custom notch size.

Other Width Field

Enter the width in millimeters of the custom size notch you desire.

Other Height Field

Enter the Height in millimeters of the custom size notch you desire.

Shape Panel

Notch (Rectangular) Radio Button

Select this radio button to select a rectangular notch. Use this if you want to use flat carbon fiber strips, plywood or hardwood for reinforcement.

“V” Groove Radio Button

Select this radio button to select a V shaped notch. You can use this for aileron or elevator cuts in preparation to hinge the surface. These are typically done as “flush” and from the bottom of the airfoil at approximately 75~85% of the airfoil location.

Circular (Rod/Tube) Radio Button

Select this radio button to select a circular notch. This is useful when you want to reinforce the wing with carbon fiber tubes, carbon fiber rods or wooden dowels.

“/” Groove

Select this radio button to select a / shaped notch. One side of the cut is done straight down, while the other is done at an angle as specified by the size of the notch. You can use this for aileron or elevator cuts in preparation to hinge the surface. These are typically done as “flush” and from the bottom of the airfoil at approximately 75~85% of the airfoil location.

Recessed Panel

2mm Radio Button

Select this radio button if you want the notch to be recessed 2mm from the surface of the airfoil.

3mm Radio Button

Select this radio button if you want the notch to be recessed 3mm from the surface of the airfoil.

4mm Radio Button

Select this radio button if you want the notch to be recessed 4mm from the surface of the airfoil.

5mm Radio Button

Select this radio button if you want the notch to be recessed 5mm from the surface of the airfoil.

6mm Radio Button

Select this radio button if you want the notch to be recessed 6mm from the surface of the airfoil.

7mm Radio Button

Select this radio button if you want the notch to be recessed 7mm from the surface of the airfoil.

Other Radio Button

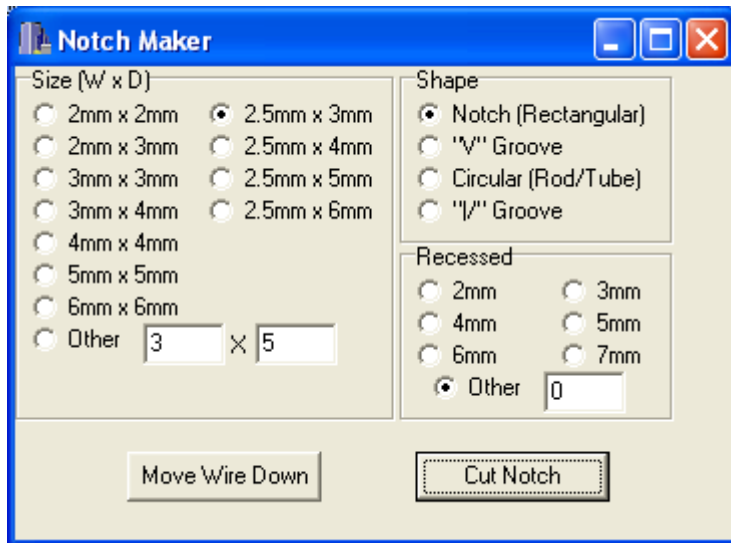
Move Wire Down Button

After a notch is cut the wire automatically moves 0.100" up to avoid melting the surface. This button is a quick way to move the wire down from this window should you need to perform the operation again. Pressing this button will move the wire down 0.100 inches or 2.54mm in metric mode.

Cut Notch Button

Once the selections are made for the shape, size and recess of the notch, press this button to cut the notch. If temperature control is configured and enabled the wire is turned ON moves up 0.100 inches or 2.54mm in metric mode, the wire is turned ON, the notch is cut, and the wire is turned off. The wire ending position is 0.100 inches or 2.54mm in metric mode, higher than when it started. This is to avoid over melting the foam and to clear the surface.

Notch Maker Window



Size Panel

Please note that due to way to many factors these settings might not produce the exact amount you desire. Wire, temperature, federate speed, material amount, wing shape and thickness among other things make this a very challenging cut. You should practice, fine tune and get to know your machine when using this feature. In many instances the stand alone Notch Maker toll produce better results after the wing is cut.

2mm x 2mm Radio Button

This radio button specifies a notch 2mm wide by 2mm high.

2mm x 3mm Radio Button

This radio button specifies a notch 2mm wide by 3mm high.

3mm x 3mm Radio Button

This radio button specifies a notch 3mm wide by 3mm high.

3mm x 4mm Radio Button

This radio button specifies a notch 3mm wide by 4mm high.

4mm x 4mm Radio Button

This radio button specifies a notch 4mm wide by 4mm high.

5mm x 5mm Radio Button

This radio button specifies a notch 5mm wide by 5mm high.

6mm x 6mm Radio Button

This radio button specifies a notch 6mm wide by 6mm high.

2.5mm x 3mm Radio Button

This radio button specifies a notch 2.5mm wide by 3mm high.

2.5mm x 4mm Radio Button

This radio button specifies a notch 2.5mm wide by 4mm high.

2.5mm x 5mm Radio Button

This radio button specifies a notch 2.5mm wide by 5mm high.

2.5mm x 6mm Radio Button

This radio button specifies a notch 2.5mm wide by 6mm high.

Other Radio Button

This radio button specifies a custom notch size.

Other Width Field

Enter the width in millimeters of the custom size notch you desire.

Other Depth Field

Enter the Height in millimeters of the custom size notch you desire.

Shape Panel

Notch (Rectangular) Radio Button

Select this radio button to select a rectangular notch. Use this if you want to use flat carbon fiber strips, plywood or hardwood for reinforcement.

“V” Groove Radio Button

Select this radio button to select a V shaped notch. You can use this for aileron or elevator cuts in preparation to hinge the surface. These are typically done as “flush” and from the bottom of the airfoil at approximately 75~85% of the airfoil location.

Circular (Rod/Tube) Radio Button

Select this radio button to select a circular notch. This is useful when you want to reinforce the wing with carbon fiber tubes, carbon fiber rods or wooden dowels.

“/” Groove

Select this radio button to select a / shaped notch. One side of the cut is done straight down, while the other is done at an angle as specified by the size of the notch. You can use this for aileron or elevator cuts in preparation to hinge the surface. These are typically done as “flush” and from the bottom of the airfoil at approximately 75~85% of the airfoil location.

Recessed Panel

2mm Radio Button

Select this radio button if you want the notch to be recessed 2mm from the current wire location.

3mm Radio Button

Select this radio button if you want the notch to be recessed 3mm from the current wire location.

4mm Radio Button

Select this radio button if you want the notch to be recessed 4mm from the current wire location.

5mm Radio Button

Select this radio button if you want the notch to be recessed 5mm from the current wire location.

6mm Radio Button

Select this radio button if you want the notch to be recessed 6mm from the current wire location.

7mm Radio Button

Select this radio button if you want the notch to be recessed 7mm from the current wire location.

Other Radio Button

Move Wire Down Button

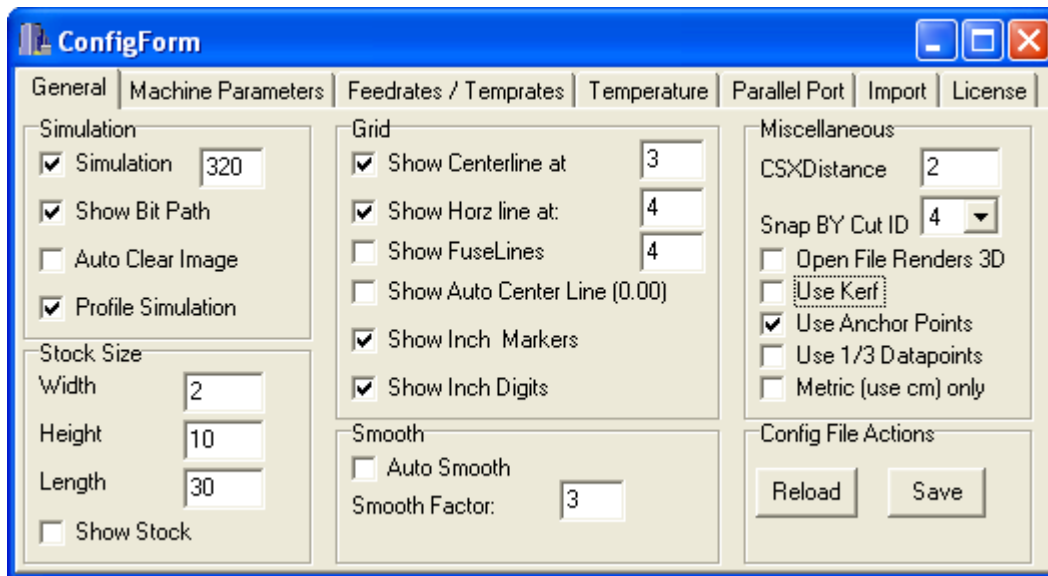
After a notch is cut the wire automatically moves 0.100” or 2.54mm in metric mode up to avoid melting the surface. This button is a quick way to move the wire down from this window should you need to perform the operation again. Pressing this button will move the wire down 0.100 inches or 2.54mm in metric mode.

Cut Notch Button

Once the selections are made for the shape, size and recess of the notch, press this button to cut the notch. If temperature control is configured and enabled the wire is turned ON moves up 0.100 inches or 2.54mm in metric mode, the wire is turned ON, the notch is cut, and the wire is turned off. The wire ending position is 0.100 inches or 2.54mm in metric mode higher than when it started. This is to avoid over melting the foam and to clear the surface.

Configuration Window

General Tab



Simulation Panel

Simulation Check Box

When the Simulation check box is checked no commands are sent to the cnc machine. Use this mode to preview cutting of parts prior to the actual cut.

Simulation Refresh Rate

The Simulation Refresh Rate is used by the TJZOIDE software to refresh the CNC bit movement screen. You should rarely need to change this field.

Show Bit Path Check Box

When the Show Bit Path check box is checked the CNC screen draws the path being taken by the Blue and Green tower. It is highly recommended you keep this check box checked as it provides a visual progress status of the cut.

Auto Clear Image Check Box

When the Auto Clear Image check box is checked the CNC screen image is cleared and coordinates reset every time a fuselage part or wing is cut. It is sometimes useful to clear this check box to compare bit path between on cut and another.

Profile Simulation Check Box

When the Profile Simulation check box is checked the image in the CNC screen drawn is that of the cross section profiles. Having this checkbox checked is useful to visually inspect the cut about to be made. When this check box is cleared the actual tower movement path is drawn in the screen. This in most instances will look deformed, off size, possibly go off screen and unrecognizable. This is as designed. The actual part will be cut as displayed when this check box is checked.

Stock Size Panel

Stock Width Field

This field specifies the width of the foam stock you want to use. This setting is used to draw lines in the screen showing the width of the foam stock you want to use.

Stock Height Field

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This Field is not currently used in the program.

Stock Length Field

This Field is not currently used in the program.

Show Stock Check Box

When this check box is checked lines are drawn in the screen showing the width of the foam stock you want to use.

Grid Panel

Show Center Line Check Box

When this check box is checked a vertical line is drawn in the screen at the offset specified in the Vertical Center Line Field amount.

Vertical Center Line Location Field

This field specifies where to draw a vertical centerline. This line is used by the Center Vertically button to center an object vertically along this line.

Show Horizontal Center Line Check Box

When this check box is checked a horizontal line is drawn in the screen at the offset specified in the Horizontal Center Line Field amount.

Horizontal Center Line Location Field

This field specifies where to draw a horizontal centerline. This line is used by the Center Horizontally button to center an object horizontally along this line.

Show Fuselage Line Check Box

When this check box is checked a fuselage top profile line and a fuselage bottom profile line is drawn in the screen. If no fuselage profile image has been imported, only one line will be visible, located at the fuselage line offset field specified amount.

Fuselage Line Offset Field

This field specifies by what amount the imported fuselage top and bottom lines (if any) should be offset. Set this field to a value higher than the total height of the fuselage being designed.

Show Auto Center Line Check Box

When this check box is checked a centerline computed using ALL of the cross sections in the current fuselage is drawn in the screen.

Show Inch (cm) Marker Check Box

When this check box is checked Inch markers are printed in the TJZOIDE main screen showing inch dimensions (cm dimensions in metric mode).

Show Inch (cm) Digits Check Box

When this check box is checked digits are printed in the TJZOIDE main screen showing inch dimensions (cm dimensions in metric mode). relative to the centerlines.

Smooth Panel

Auto Smooth Check Box

Check this box when you want to smooth a cross section object imported from a .jpg or .bmp file automatically. Objects can be rough due to the scan and import process. Smoothing makes the objects more rounded.

Miscellaneous Panel

Cross Section Distance Field

This is the default distance between cross sections. You can override the cross section location by clicking on the 'Z' field of the Main TJZOIDE Window cross section information panel.

Snap By Cut Id Field

This dropdown field specifies which cut id to use for centering to configured centerlines when the “Center by Cut ID” button is pressed..

Open File Renders 3D Check Box

When this check box is checked TJZOIDE will do a Render 3D Model whenever a file is opened.

Use Kerf Check Box

When this check box is checked TJZOIDE will use the kerf compensation values set for each cross section. If this check box is cleared, no compensation is done.

Use Anchor Points Check Box

When this check box is checked TJZOIDE will use anchor points while cutting fuselage parts. Anchor points should be added after the airplane design is complete. Anchor points might change location and need to be adjusted if the design is changed. When this check box is not set, anchor points are not used and the Anchors button in the main window is hidden.

Metric (use CM) only Check Box

When this check box is checked TJZOIDE will switch to metric units of measurements. If this check box is cleared, inch system is used. There is no conversion performed between metric and inch when this checkbox is selected. It is highly recommended you stay with one system of measurement. The selection for this checkbox is stored with your airplane design and is restored when the file is opened. Our design examples have been created both using inch system and metric system. Open the appropriate one for you.

Configuration File Actions panel

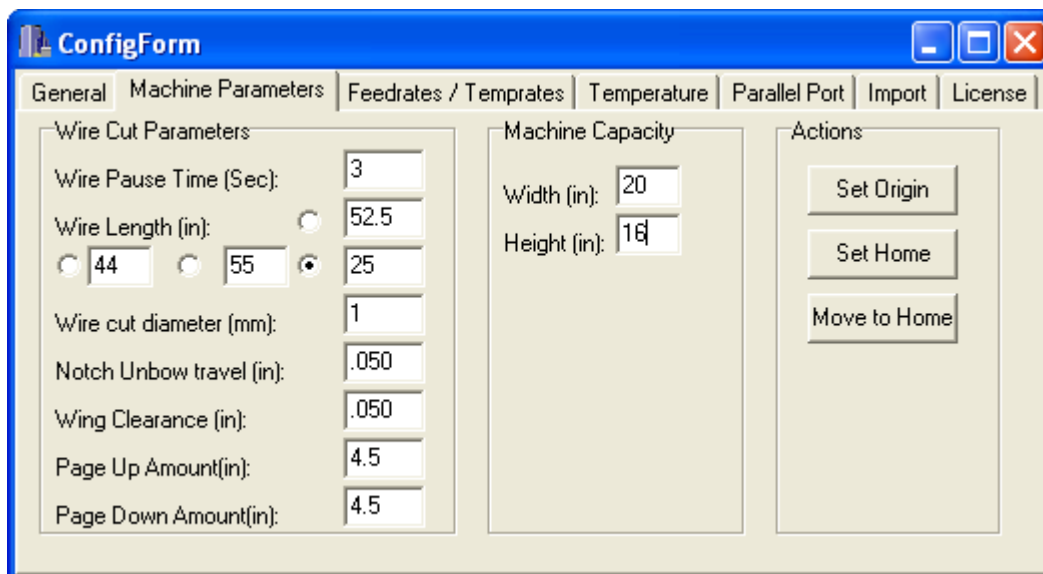
Reload Configuration Button

The Reload configuration button loads the last saved configuration. Configuration file is automatically loaded when the program starts

Save Configuration button

The Save configuration button writes the configuration changes made during this session to the configuration file. The configuration file is automatically saved when the program ends. This button rarely needs to be done.

Machine Parameters Tab



Wire Cut Parameters panel

Wire Pause Time field

Use this field to specify how many seconds the machine should pause to allow the wire keep up with the actual movement. This pause time is used when switching between cut ids where many 90 degree turns occur. A good starting point for this field is 3 seconds or so.

Wire Length fields

When cutting various parts you will find that shorter wire length work better and cut faster thinner fuselage sections, while longer wire lengths are necessary for cutting long wings. This configuration feature in conjunction with the Wire Length Selection Radio Buttons allow to quickly select between predetermined wire length. The wire length **MUST** be set to the distance between pivot points of the wire. It should include springs and any hardware that angles with the wire. **It is of utmost importance that this distance is accurate.** TJZOIDE uses this information to project parts to be cut. If this distance is not accurate you will not be able to cut precise parts, and if way off, the part will be unusable.

Wire Length Selection Radio Boxes

Select the Radio Button to the left of the Wire Length field your machine is currently set to.

Wire cut diameter field

This field is used to specify the diameter of the cut that your wire makes when cutting parts. It is only used when cutting wings.

Notch Unbow travel field

Enter the amount of travel the machine should move in the opposite direction when cutting notches in wing designs to unbow the wire inside the material and attain better notches inside wings. This amount is limited to a maximum of 0.300 inches (0.8 cm in metric mode).

Wing Clearance field

When using the various move wing thickness buttons in the Wings tab of the CNC Window this clearance is added to the top and bottom of the airfoil.

Page Up amount field

Specify the how many inches (cm in metric mode) you want the cnc machine to move the wire up when the Page Up Key is pressed.

Page Down amount field

Specify the how many inches (cm in metric mode) you want the cnc machine to move the wire down when the Page Down Key is pressed.

Machine Capacity Panel

Machine Width

Set this field to the maximum amount of travel forward and back that your machine can support. This value is used when the buttons in the “Cut Statistics” panel of the Fuselage tab in the CNC Window are pressed.

Machine Height

Set this field to the maximum amount of travel up and down that your machine can support This value is used when the buttons in the “Cut Statistics” panel of the Fuselage tab in the CNC Window are pressed.

Actions Panel

Set Origin Button

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When this button is pressed the current tower positions are saved in the configuration file as the lower back corner position of your cnc machine. Currently this field is not used by TJZOIDE.

Set Home Button

When this button is pressed the current tower positions are saved as the home position. This position is used by the Move Home button and Home Key hot key.

Move to Home Button

When this button is pressed the towers are moved to the previously stored home position.

Feedrates / Temprates Tab

CNC Move Feedrates Panel

Feedrates are relative speed numbers. Low numbers are low speeds while High numbers are high speeds. 10000 and 40000 are typical low and high feedrates. In general, higher drive voltages allow for higher speeds. X motors refer to forward and back movement while Y motors refer to up and down movement. Blue tower refers to the Right side tower of your machine, Green tower refers to the Left side tower of your machine when viewed from the front (your right, your left).

Y Blue federate field

This is the feedrate speed for the Y motor of the Blue tower used when the CNC Screen, Move Wire Panel FWD/BACK/UP/DOWN buttons.

X Blue federate field

This is the feedrate speed for the X motor of the Blue tower used when the CNC Screen, Move Wire Panel FWD/BACK/UP/DOWN buttons.

Y Green federate field

This is the feedrate speed for the Y motor of the Green tower used when the CNC Screen, Move Wire Panel FWD/BACK/UP/DOWN buttons.

X Green federate field

This is the feedrate speed for the X motor of the Green tower used when the CNC Screen, Move Wire Panel FWD/BACK/UP/DOWN buttons.

Temp federate field

This is the feedrate speed for the stepper motor controlling the temperature, or the solid state temperature control board.

Move federate field

This is the feedrate speed for all motors when making coupled moves with the CNC Control Tab, Wire Panel UP/DOWN/FWD/BACK buttons and hot key movements when the Move Speed radio button is checked.

Cut Feedrates Panel

Fuselage Cut Feedrate Field

The Fuselage Cut Feedrate field specifies the feedrate speed to use to cut fuselage parts.

Wing Cut Feedrate Field

The Wing Cut Feedrate field specifies the feedrate speed to use to cut wings.

Nacelle Cut Feedrate Field

The Nacelle Cut Feedrate field specifies the feedrate speed to use to cut nacelles.

Notch Cut Feedrate Field

The Notch Cut Feedrate field specifies the feedrate speed to use to cut notches.

Fast Cut Feedrate Field

The Fast Cut Feedrate field specifies the feedrate speed motors can move. This speed is used when the projection of a part into the towers requires is to move higher distances than those being cut in the part. The effective feedrate into the part in many instances is much less than the desired/configured on. In this scenario, the motors move faster than the Cut feedrate specified, up to the Fast Cut Feedrate speed. Set this value to the maximum speed your hardware can support reliably, without missing steps.

Cut Temperature Panel

Fuselage Cut Temperature setting

Low – cut fuselages at the low temperature setting in the Temperature Tab of the Configuration window Mechanical (Angles) tab

High – cut fuselages at the high temperature setting in the Temperature Tab of the Configuration window Mechanical (Angles) tab

Variable – continuously adjust temperature angle position while cutting fuselages using a value proportional to the lookup table configured in the Feedrate table of the Temperature tab in the configuration window.

Proportional – adjust temperature angle position ONCE before cutting fuselages using a value proportional to the lookup table configured in the Feedrate table of the Temperature tab in the configuration window.

Wing Cut Temperature setting

Low – cut wings at the low temperature setting in the Temperature Tab of the Configuration window Mechanical (Angles) tab

High – cut wings at the high temperature setting in the Temperature Tab of the Configuration window Mechanical (Angles) tab

Variable – continuously adjust temperature angle position while cutting wings using a value proportional to the lookup table configured in the Feedrate table of the Temperature tab in the configuration window.

Proportional – adjust temperature angle position ONCE before cutting wings using a value proportional to the lookup table configured in the Feedrate table of the Temperature tab in the configuration window.

Nacelle Cut Temperature setting

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Low – cut nacelles at the low temperature setting in the Temperature Tab of the Configuration window Mechanical (Angles) tab

High – cut nacelles at the high temperature setting in the Temperature Tab of the Configuration window Mechanical (Angles) tab

Variable – continuously adjust temperature angle position while cutting nacelles using a value proportional to the lookup table configured in the Feedrate table of the Temperature tab in the configuration window.

Proportional – adjust temperature angle position ONCE before cutting nacelles using a value proportional to the lookup table configured in the Feedrate table of the Temperature tab in the configuration window.

Notch Cut Temperature setting

Low – cut notches at the low temperature setting in the Temperature Tab of the Configuration window Mechanical (Angles) tab

High – cut notches at the high temperature setting in the Temperature Tab of the Configuration window Mechanical (Angles) tab

Variable – continuously adjust temperature angle position while cutting notches using a value proportional to the lookup table configured in the Feedrate table of the Temperature tab in the configuration window.

Proportional – adjust temperature angle position ONCE before cutting notches using a value proportional to the lookup table configured in the Feedrate table of the Temperature tab in the configuration window.

Temperature Tab

Feedrate	Position
100000	150.00
166750000	166.67
333400000	183.33
500050000	200.00
666700000	216.67
833350000	233.33
1000000000	250.00

Settings Panel

Use Temperature Control Check Box

The Use Temperature Control check box enables or disables the temperature control. Temperature control is enabled when the check box is checked.

Turn On Before cut Check Box

When the Turn On before cut check box is checked, TJZOIDE moves the temperature position to the computed angle based on other configuration as well as other factors.

Turn Off when done Check Box

When the Turn OFF when done check box is checked, TJZOIDE moves the temperature position to the configured off position after TJZOIDE finishes the current cut.

Turn Off when program exits Check Box

When the Turn OFF when program exits check box is checked, TJZOIDE moves the temperature position to the configured off position just before the program exits.

Start On Position Field

Some control setups require that a minimum power level be applied before the circuit is active. The Start On Position field specifies where to move initially prior to starting a cut. This can also be used with the solid state temperature control board to preheat the wire upon cut startup.

Control Interval Field

The Control Interval field specifies in seconds how often a temperature adjustment can be made. For mechanical setups 1 to a few seconds is appropriate to protect wear of the temperature control mechanism. Set this to 0 seconds when using the solid state temperature control board.

Mechanical (angles) Panel

Total travel angle field

Enter the total travel angle for your mechanical setup, one full turn being an angle of 360 degrees. You can set this to a lower or higher amount depending on your setup. If using the solid state temperature control board, this field can be set up to an angle of 450 degrees. However 450 represents a 100% duty cycle where in most practical applications is too much. 250 is a more reasonable amount.

Power Off position field

Enter the angle where the power is off. For the solid state temperature control board enter 0

High Temperature position field

Enter the angle where the power is at the desired high temperature level. Start with a low value, turn on the wire using the CNC Control tab Wire ON button and make a test cut with the foam material you will be using. Increment or decrement the value as needed. The High temperature position is intended to support the faster cut federates. If you start with a value too high you might burn the wire. Please follow all safety precautions when dealing with electricity and heated elements!

Low Temperature position field

Enter the angle where the power is at the desired low temperature level. Start with a low value, turn on the wire using the CNC Control tab Wire LO button and make a test cut with the foam material you will be using. The Low temperature position is intended to support low speed cuts so the wire cuts but does not melt excessively when the wire is moving slow. Increment or decrement the value as needed. If you start with a value too high you might burn the wire. Please follow all safety precautions when dealing with electricity and heated elements!

Overshoot Off position amount field

When using a mechanical setup it is possible to loose steps or slip control. This field is provided as a safety feature to overshoot the off position when a mechanical stop is present. Set this to a few degrees when using a mechanical setup with a mechanical stop. The solid state control board emulates a mechanical setup, so it is also advised to set this field to a few degree angle as a safety precaution, in the event step signals are missed.

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Find Stop when program starts Check Box

When using a mechanical setup with a mechanical stop set this check box so that when the program starts the stepper motor moves towards the mechanical stop. The solid state control board emulates a mechanical setup, so it is also advised to check this check box as a safety precaution, in the event initial state is not at the off position.

Unbind Check Box

Check this box to so that after an overshoot or mechanical stop is done the stepper motor is moved about a 2 degree angle away from the mechanical stop to unbind the motor.

Feedrate Table Panel

Feedrate Column

The Feedrate Column should be set in increasing feedrate order from top to bottom, low to high. This feedrate/position table is used by TJZIODE to determine temperature position based on temprate configuration (LOW, HIGH, VARIABLE, PROPORTIONAL).

Feedrate Reset Button

The Feedrate Reset button makes it easy to populate the feedrate column. Enter the low feedrate your cnc machine supports (10000 is a good starts) in the top field. Enter the high feedrate your cnc machine supports (typically 30000 to 40000). When the Feedrate Reset button is pressed, the Feedrate column is populated using these to values to compute the intermediate values proportionally.

Temperature Position Angle Column

The Temperature Position Angle Column is used to compute the appropriate temperature based on effective feedrate. These can be manually entered to form a 7 point curve or populated using the Temperature Angle Reset button.

Temperature Angle Reset Button

Press the reset button to automatically populate the table with proportional values to the configured Low and High temperature position angle setting.

Parallel Port Tab

Axis	Address	Step	Pinout Dir	Enable	Resolution	Reverse	TPI / Pitch	Stepper Steps/Rev	
Blue Y	0x378	2	3	14	1/2 Step	<input checked="" type="checkbox"/>	20	200	Test
Blue X	0x378	4	5	14	1/2 Step	<input checked="" type="checkbox"/>	20	200	Test
Green Y	0x378	6	7	14	1/2 Step	<input checked="" type="checkbox"/>	20	48	Test
Green X	0x378	8	9	1	1/2 Step	<input checked="" type="checkbox"/>	20	200	Test
Temp	0x378	16	17	NA	1/2 Step	<input type="checkbox"/>			Test

☐ Set Enable bits low after cut Get LPT Address

Axis Column

Blue Y Axis

The Blue Y axis is the up/down direction right tower (your right when looking at the machine from the front). Up direction as the tower moving the wire up, back direction is the tower moving the wire down.

Blue X Axis

The Blue X axis is the forward/back direction right tower (your right when looking at the machine from the front). Forward direction as the tower moving closer to you, back direction is the tower moving away from you.

Green Y Axis

The Green Y axis is the up/down direction left tower (your left when looking at the machine from the front). Up direction as the tower moving the wire up, back direction is the tower moving the wire down.

Green X Axis

The Green X axis is the forward/back direction left tower (your left when looking at the machine from the front). Forward direction as the tower moving closer to you, back direction is the tower moving away from you.

Temperature axis

This is the configuration row for the temperature control stepper motor or solid state control board.

Address Columns

This is the parallel port address of the parallel port that us used to interface with your CNC hotwire foam cutting machine. This address should be entered in hexadecimal notation with a leading 0x in the value.

Pinout Column

Step Pin

Refer to the stepper motor driver board manual to determine which pin to use for the step signal.

Direction Pin

Refer to the stepper motor driver board manual to determine which pin to use for the direction signal.

Enable Pin

Refer to the stepper motor driver board manual to determine which pin to use for the enable signal.

Resolution Column

New starting with VERSION 2010-05-26-A FULL, 1/2, 1/4, 1/8, and 1/16 step resolutions are supported. The preferred resolution however is 1/2. Prior versions only support 1/2.

Reverse Column

Set this check box to reverse direction if necessary. Keep in mind that you can reverse direction at the hardware lever by rewiring the motor connection to the driver board which should not be too involved. Sometimes this approach is more desirable so that the direction of drawn views in the CNC window are more intuitive. Blue X reverse checked and all others unchecked provide best results.

TPI / Pitch Column

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Specify the Threads Per Inch (alternatively Turns Per Inch) or pitch (typically for metric lead screws) for this axis.

Stepper Steps/Revolution Column

NEW starting with VERSION 2010-12-14-A Specify the stepper motor Steps per revolution. Currently 200 steps/revolution (1.8 degree motors) and 48 steps/revolution (7.5 degree motors) are supported.

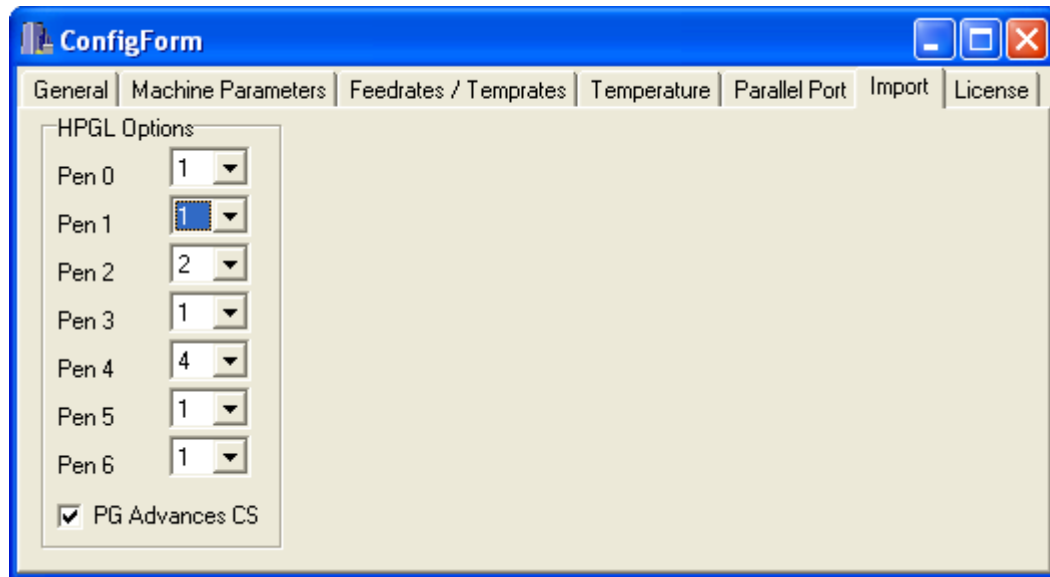
Get LPT Address

The **Get LPT Address** button queries the BIOS for installed parallel port addresses. Note that this tool will only detect BIOS based parallel ports. You might have other PCI ports that might not be detected by this tool. Use the Windows Device Manager, Ports window, Resources tab to determine the port address to use.

Test Buttons

These move the stepper motor a small amount to easily verify motor operation.

Import Tab



HPGL Options Panel

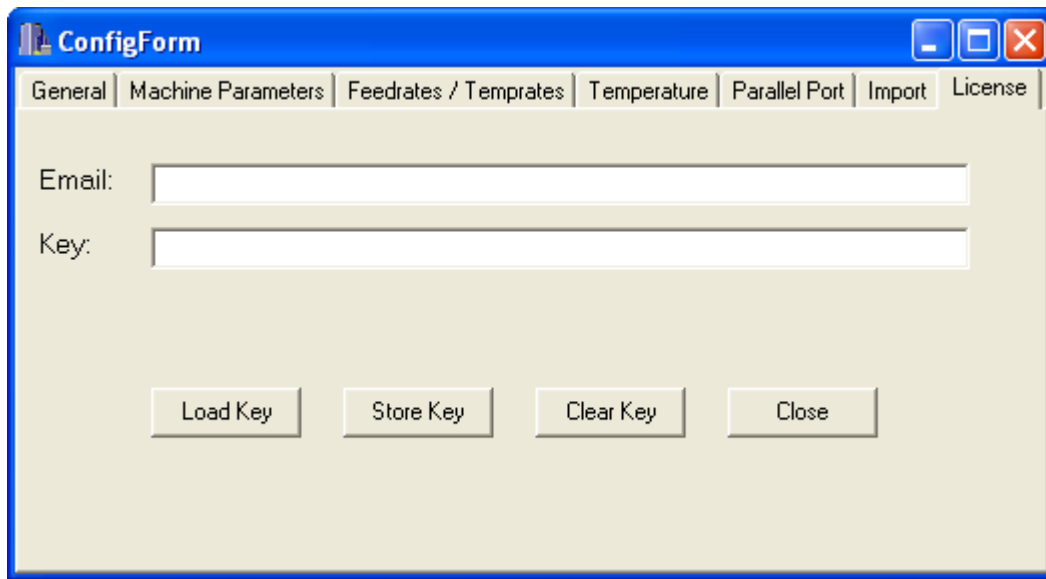
Pen 0 though 6 drop down menu

When importing HPGL drawings, you can map Pen IDs 0 through 6 to a specific cut id. Use these dropdowns to specify the mappings.

PG advances CS check box

When this check box is checked, is the PG instruction is found in the HPGL import file, the Cross Section is advanced and import continues in the new cross section.

License Tab



Email Id field

This email in combination with the License Key field authorize all program features. This email must be the one provided with your purchase. Do NOT change this information as this will invalidate your License Key.

License Key field

This License Key in combination with the Email ID field authorize all program features. This License Key must be the one provided with your purchase. Do NOT change this information as this will invalidate your License Key.

Load Key Button

Press the Load Key button to load the license key file that came with your purchase. A load file requester comes up. Select the license file. After the license file is loaded the key information is stored in your computer and all TJZOIDE features are enabled.

Store Key Button

Information from the license file can be typed into the Email ID and License Key fields. In such instances you need to use the Store Key button to store the information in your computer.

Clear Key Button

Use the Clear Key button to clear the Email ID and License Key fields. Pressing this button will not remove any stored license keys in your computer.

Close Configuration Button

The Close Configuration button closes the configuration window. Use this button once you have completed entering the license key.

HPGL Import

HPGL imports support the following instructions, none other are supported.

- VS speed [,pen] - pen speed, pen select (ignore speed, Pen only is used)
- PU - pen up
- PD - pen down
- PA - plot absolute
- PR - plot relative
- IN - initialize. Pen only is used
- DF - default. Pen only is used
- EA - edge absolute rectangle
- RA - fill absolute rectangle - treated same as EA
- ER - edge relative rectangle
- RR - fill relative rectangle - treated same as RR
- CI - circle
- SP - select pen (assign cutid)
- PG - eject page (increment Cross Section ID)

Keep in mind however, that not all drawings make sense for this application, so, just because it is HPGL does not mean it is importable or can be used with tjzoide. This is a new feature for this release.

Keyboard Hot Keys Quick Reference

Temperature control feature has to be configured and enabled for the temperature control features to work properly.

* - toggles the Keypad On check box.

/ - toggles the Simulation check box

+ - select the Move speed – sets the Move Radio button

- - select the Cut speed – sets the Cut Radio button

Up Arrow key – moves both Blue and Green towers UP simultaneously.

Down Arrow key – moves both Blue and Green towers DOWN simultaneously.

Left Arrow key – moves both Blue and Green towers BACK simultaneously.

Right Arrow key – moves both Blue and Green towers FORWARD simultaneously.

8 – moves the Blue tower UP.

2 – moves the Blue tower DOWN.

4 – moves the Blue tower BACK.

6 – moves the Blue tower FORWARD.

5 – moves the Green tower UP.

0 – moves the Green tower DOWN.

1 – moves the Green tower BACK.

3 – moves the Green tower FORWARD.

. – the period pauses the cut. A requester dialog box comes up in the screen to continue or cancel the cut

I – the letter I increases the temperature control angle position

D – the letter D decreases the temperature control angle position.

M – the letter M selects the Move speed – sets the Move Radio button

C – the letter C selects the Cut speed – sets the Cut Radio button

S – the letter S toggles the simulation check box

H – the letter H moves the temperature control to the High temp position.

L – the letter L moves the temperature control to the Low temp position

O – the letter O moves the temperature control to the Off temp position.

K – the letter K toggles the Keypad On check box

Home key – the home key moves the towers to the previously stored home location.

END key – the end key immediately cancels the cut in progress and turns of the wire if the temperature control feature is configured and enabled.

Page Up key – the page up key moves the towers up by the configured amount in the Machine Parameters tab of the Configuration window.

Page Down key – the page down key moves the towers down by the configured amount in the Machine Parameters tab of the Configuration window.

Hardware Settings

Tower Orientation

Blue Tower location

When facing your CNC machine, the blue tower should be the tower at your right.

Green Tower Location

When facing your CNC machine, the green tower should be the tower at your left.

Forward Movement

When facing your CNC machine and the FWD button is pressed in the CNC Control tab of the CNC window the wire/towers should move towards you, closer to you.

Backward Movement

When facing your CNC machine and the BACK button is pressed in the CNC Control tab of the CNC window the wire/towers should move away from you, farther from you.

Up Movement

When facing your CNC machine and the UP button is pressed in the CNC Control tab of the CNC window the wire/towers should move up.

Down Movement

When facing your CNC machine and the DOWN button is pressed in the CNC Control tab of the CNC window the wire/towers should move down.

It is recommended that you wire the stepper motors in such a way that this behavior is observed. Please refer to the Parallel Port tab in the Configuration window section in this document for more information